U.S. DEPARTMENT OF ENERGY

PUBLIC MEETING ON ENERGY CONSERVATION STANDARDS FOR AUTOMATIC COMMERCIAL ICE MAKERS

Room 8E-089
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

9:00 a.m.
Thursday, February 16, 2012

DOUG BROOKMAN, Facilitator

U.S. Department of Energy Attendees

CHARLES LLENZA
ARI ALTMAN

Attendees

TOM ECKMAN, Conservation Manager
Power Division
Northwest Power and Conservation Council
851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348

MARY C. HOWE, President, Chairman
Howe Corporation
1650 North Elston Avenue
Chicago, Illinois 60642

LOUIS STARR, P.E., CEM
Northwest Energy Efficiency Alliance

DETLEF WESTPHALEN, Associate Director
Navigant Consulting
77 South Bedford Street, Suite 400
Burlington, Massachusetts 01803

DARYL ERBS, Director of Engineering
Manitowoc, Inc.
2110 South 26th Street
P.O. Box 1720
Manitowoc, Wisconsin 54221-1720

Attendees

JOANNA MAUER, Technical Advocacy Coordinator
Appliance Standards Awareness Project
529 14th Street, NW, Suite 600
Washington, D.C. 20045

MEG WALTNER, Energy Efficiency Advocate
Natural Resources Defense Council
1152 15th Street, NW, Suite 300
Washington, D.C. 20005

KARIM AMRANE, Ph.D., Vice President
Regulatory and Research
Air-Conditioning, Heating, and Refrigeration
Institute (AHRI)
2111 Wilson Boulevard, Suite 500
Arlington, Virginia 22201

TIMOTHY BALLO, Esquire, Associate Attorney
EarthJustice
1625 Massachusetts Avenue NW, Suite 702
Washington, D.C. 20036

ROB CARMICHAEL
Navigant Consulting
1200 Nineteenth Street NW, Suite 700
Washington, D.C. 20006

NATHANIEL L. CLAYVILLE, Associate Economist
Pacific Northwest National Laboratory
Technology Planning and Deployment
902 Battelle Boulevard
P.O. Box 999, MSIN K6-05
Richland, Washington 99352

MATT ALLISON, Vice President of Engineering
Scotsman Ice Systems
775 Corporate Woods Parkway
Vernon Hills, Illinois 60061

BEN BARRINGTON, Energy
Navigant Consulting
77 South Bedford Street, Suite 400
Burlington, Massachusetts 01803

Attendees

ALAN COOKE, Senior Research Economist
Pacific Northwest National Laboratory
Technology Planning and Deployment
902 Battelle Boulevard
P.O. Box 999, MSIN K6-05
Richland, Washington 99352

MARK O'MALLEY
Howe Corporation
444 North Michigan Avenue
Chicago, Illinois

KURT KLINKE
Navigant Consulting
1200 Nineteenth Street NW, Suite 700
Washington, D.C. 20006

CHRISTOPHER KENT
U.S. Environmental Protection Agency
1400 Pennsylvania Avenue, NW
Washington, D.C.

A G E N D A

ITEM:	PAGE:
Morning Session	
Welcome, Introductions, Agenda Review, and Opening Statements Doug Brookman	5
Standards Rulemaking Overview Charles Llenza	10
Test Procedure Final Rule Availability Charles Llenza	12
Market and Technology Assessment, Screening Analysis, and Engineering Analysis Detlef Westphalen	17
Markups Analysis, Energy Use Analysis, and Life-Cycle Cost and Payback Period Analysis Alan Cooke	94
Afternoon Session	
Shipments Analysis and National Impact Analysis Nathaniel Clayville	144
Manufacturer Impact Analysis Ben Barrington	158
NOPR Analyses: Utility Impact Analysis, Employment Impact Analysis, Emissions Analysis and Valuation, and Regulatory Impact Analysis Ben Barrington	162
Next Steps and Closing Remarks Doug Brookman	175

1 P R O C E E D I N G S

2 (9:00a.m.)

3 Welcome, Introductions, Agenda Review, and Opening

4 Statements

5 MR. BROOKMAN: Let's start. Good morning,

6 everyone and welcome.

7 This is the U.S. Department of Energy's

8 Public Meeting on Energy Conservation Standards for

9 Automatic Commercial Ice Makers. Today is Thursday,

10 February 16th, 2012, here in the Forrestal Building.

11 My name's Doug Brookman from Public Solutions

12 in Baltimore. Glad you could join us this morning.

13 Happy to have you here.

14 We're going to start off this morning with

15 Welcoming Remarks from Charles Llenza.

16 MR. LLENZA: Welcome to today's proceedings

17 and we're here today to discuss the Preliminary

18 Analysis for the Energy Conservation Standards for the

19 Automatic Ice Makers Rulemaking here at the Department

20 of Energy.

21 MR. BROOKMAN: Let's start with

1 Introductions. Let's start over here. Please say your
2 name and organizational affiliation. You can also get
3 used to turning on these microphones. Are the mikes
4 working well today? They're okay? Okay. So I think
5 we'll start with Daryl, please.
6 MR. ERBS: Okay. Daryl Erbs, Manitowoc Ice.
7 MR. ALLISON: Matt Allison, Scotsman Ice
8 Systems.
9 MR. ECKMAN: Tom Eckman, Northwest Power and
10 Conservation Council.
11 MS. MAUER: Joanna Mauer, Appliance Standards
12 Awareness Project.
13 MS. WALTNER: Meg Waltner, Natural Resources
14 Defense Council.
15 MR. BALLO: Tim Ballo, EarthJustice.
16 MS. HOWE: Mary Howe, Howe Corporation.
17 DR. AMRANE: Karim Amrane, Air Conditioning,
18 Heating, and Refrigeration Institute.
19 MR. ALTMAN: Ari Altman, DOE GC's Office.
20 MR. BROOKMAN: You can just stand up. We
21 know who's here.
22 MR. WESTPHALEN: Detlef Westphalen, Navigant
23 Consulting.
24 MR. COOKE: Alan Cooke, Pacific Northwest
25 National Lab.

1 MR. BARRINGTON: Ben Barrington, Navigant
2 Consulting.
3 MR. CLAYVILLE: Nathaniel Clayville, Pacific
4 Northwest National Laboratory.
5 MR. KENT: Christopher Kent, U.S.
6 Environmental Protection Agency, EnergyStar Program.
7 MR. BROOKMAN: Thank you, and thanks again to
8 all of you for being on time so we can get an early
9 start on this meeting.
10 All of you received a packet of information
11 as you walked in the door. I'm going to run through
12 this Agenda real quickly. You also received a copy of
13 the presentation slides. This will be the bulk of the
14 content that's presented today and there's plenty of
15 opportunity for question and comment as we go through
16 that content.
17 You can see immediately following this Agenda
18 Review and a few opening slides there's an opportunity
19 for anybody that wishes to do so to make opening
20 statements, brief summary comments about issues that
21 are important to you. Immediately following that,
22 we're going to have a Rulemaking Overview and also
23 information on Test Procedure Final Rule Availability.
24 Following that, we'll move into Market and Technology
25 Assessment Screening Analysis and Engineering Analysis.

1 Immediately following that Markups Analysis, Energy Use
2 Analysis, Life-Cycle Cost and Payback Analysis.
3 I see in the Agenda there's no spot listed
4 for a midmorning coffee break but we'll probably take
5 one in there somewhere, 10:30ish or so.
6 I think I just referred to the Markups
7 Analysis, Energy Use, and Life-Cycle Cost Payback
8 Period Analysis. So then we'll go from there directly
9 into Shipments Analysis, National Impact Analysis, and
10 Manufacturer Impact Analysis, all before we break for
11 lunch around about noonish, and then immediately
12 following lunch, the NOPR Analyses. You can see them
13 listed: Utility, Employment, Emissions and Valuation,
14 Regulatory Impact, and then, finally, at the end of the
15 day today, around about 1:30 or 2, I'll describe Next
16 Steps, how you can file your comments and also another
17 opportunity for anybody that wants to to make
18 additional comments, raise any additional issues at
19 that point.
20 So that's the plan for the day. Questions,
21 comments about the Agenda?
22 (No response.)
23 MR. BROOKMAN: I see none. I'd ask for your
24 consideration. Please speak one at a time. Please say
25 your name for the record each time you speak. I'm

1 going to be queuing individuals by name as best I can.
2 I also wish to encourage follow-on comments, the back
3 and forth. It's sometimes very useful for the
4 department as they try to sort through these issues.
5 If you can keep the focus here, please turn your cell
6 phones on silent, limit your sidebar conversations, and
7 if you could also try to be concise, share the air
8 time. I'm sure there's lots to be said and we want to
9 be efficient about the conduct of these proceedings
10 today.
11 So any other issues to be raised before I
12 turn it over to Charles?
13 (No response.)
14 MR. BROOKMAN: I see none.
15 MR. LLENZA: Request for comment box.
16 MR. BROOKMAN: Request for comment box. You
17 will see, and Charles has on the screen, shown an
18 illustrative issue box. These boxes are a call-out
19 that the department has inserted into the slides to see
20 if they can get you specifically to address the issues
21 that they have listed there.
22 So if you will please -- we'll be queuing
23 them for your comment and if you would take the time to
24 thoroughly respond, that would be really, really
25 welcomed.

1 And we have how many joining us via the Web,
2 Emily? 15. Okay. So for those of you that have
3 joined us via the Web, welcome. The Department of
4 Energy is trying hard to make these meetings Web-
5 accessible and we'll do our best to try to answer
6 questions and concerns from those of you that are
7 joining us via the Web, although it's hard to do it
8 completely, we'll try. Okay.
9 MR. LLENZA: Also, one additional comment. I
10 think we'll go with the people present at the meeting
11 first and then we'll make sure that the people
12 attending the webinar, if the time allows, we'll try to
13 make sure that their questions get read for the record
14 and then also answered here at the meeting.
15 MR. BROOKMAN: We'll do our best with that.
16 MR. LLENZA: Correct.
17 MR. BROOKMAN: Okay.
18 Standards Rulemaking Overview
19 And Test Procedure Final Rule Availability
20 MR. LLENZA: Okay. So I'm going to give a
21 brief overview and a little bit on the test procedure
22 here today.
23
24 Today's purpose of this meeting is to inform
25 all interested parties that we're in the process of a

1 rulemaking and to facilitate this rulemaking process,
2 in addition to present the procedural and analytical
3 approaches in terms of what the department has come up
4 with as a preliminary for this rulemaking. We also
5 encourage the participation through this forum for
6 public discussion and we would greatly appreciate your
7 comments on our process and our presentation.
8 We strongly encourage all parties to submit
9 data, information, and/or written comments at some
10 point in time.
11 I'll be using the word "ACIM" to denominate
12 automatic commercial ice makers. So in terms of the
13 ACIM regulatory history, EPACT-2005 amended the Energy
14 Policy and Conservation Act, EPCA, to prescribe
15 standards for cube ice makers with capacities between
16 50 and 2,500 pounds per 24 hours effective January 1st,
17 2010. That authorized the department to issue
18 standards not only for these ice makers but for other
19 ice makers that are not covered under the cube ice
20 standards that were prescribed and it also directed the
21 department to issue these by no later than January 1st,
22 2015.
23 As part of this rulemaking, the initial part
24 of any type of rulemaking is that the department has to
25 have a test procedure for our rules for the automatic

1 ice makers and so we went through a process of getting
2 a test procedure issued, completed and issued on
3 January 11, 2012.
4 The effective date of this rule is February
5 10, 2012. So it's now effective, according to our
6 deadline here, and all testing starting January 7,
7 2013, is mandatory for all the automatic ice makers for
8 making representations on the energy levels for that
9 equipment to the department.
10 Let me talk a little bit about the rulemaking
11 timeline and it's changed a little since the last time
12 most of you have seen this. As you see, today is
13 February 16th, and in the timeline, if we look at the
14 lower boxes, we're in the third public meeting that
15 we're having in reference to this rulemaking.
16 We have issued the Test Procedure Final Rule
17 and that's denoted here with a little diamond as of
18 January 11th, and then we provided notification of the
19 Preliminary Analysis document which was published in
20 the Federal Register January 24th.
21 We're planning to collect the information
22 from these proceedings and then, if our timeline
23 continues, to have a NOPR document, a Notice of
24 Proposed Rulemaking document, for the Energy
25 Conservation Standard by Winter 2012, and a Final Rule

1 some time in 2013. For the planning purposes, we're
2 looking at the summer, but what I want to stress about
3 this timeline is that the statute has requested that we
4 have one by 2015. We are ahead of schedule. This was
5 one of the department's first advance regulatory
6 rulemakings and we're still ahead of schedule. This
7 has slid a little bit based on our review process. So
8 we will complete this ahead of schedule of 2015, but if
9 there are delays because we've had some delays with
10 some of the documents at the Office of Management and
11 Budget, it's possible that this could slide a little
12 bit, but we hope to complete this by the Summer of
13 2013.
14 This means that the Energy Conservation
15 Standards would become effective three years after the
16 date of publication which would be the Summer of 2016.
17 All right. We also want to stress here that
18 we'll have a public meeting on the Energy Conservation
19 Standard Notice of Proposed Rulemaking some time in the
20 Winter of 2012.
21 Okay. So today's proceedings, this is an
22 overview of today's proceedings and the different
23 topics that we will be covering today at this meeting,
24 at this public meeting.
25 Market Technology Assessment, Screening

1 Analysis, and Engineering Analysis, Preliminary
2 Manufacturer Impact Analysis, Energy Use, Markups,
3 Price Determination, and then we'll roll into Life-
4 Cycle Cost and Payback Period Analysis with Shipments
5 to come up with some National Impact Analysis
6 information.
7 So at this point, I would like to give this
8 back to Doug so that we can have opening remarks from
9 all the parties here present.
10 MR. BROOKMAN: As reflected in the Agenda,
11 now is an opportunity for anybody that wants to to make
12 brief opening remarks, raise issues that are important
13 to you.
14 Daryl.
15 MR. ERBS: Daryl Erbs, Manitowoc Ice. We'll
16 get into a lot of the details, but just for opening
17 remarks, a couple of things.
18 One is to, I guess, remind the department and
19 other stakeholders that, you know, we're a small
20 industry. You know, our production volumes compared to
21 appliances or air conditioning are, you know, orders of
22 magnitude smaller and that creates challenges for us in
23 terms of both our ability to implement new
24 technologies, but probably more importantly our ability
25 to influence the component suppliers that we depend on

1 for particularly energy efficiency gains, so
2 compressors, motors, and other things.
3 Our volumes do not drive them to make design
4 changes to implement new production. It's not economic
5 for them. So we tend to be restricted to those things
6 that they would do for other larger customers. When
7 you combine that with some of the unique
8 characteristics, particularly in batch ice machines, it
9 limits some of our options and that's something that we
10 can, you know, touch on in more detail, but I think
11 that's important.
12 In terms of the application, most ice
13 machines are part of an overall system for delivering,
14 you know, food service product, beverage, and other
15 related products, and so we're sort of in the middle of
16 a chain of equipment that places physical constraints
17 on what we can do.
18 It also has a broader impact to that whole
19 industry than you would just see by looking at changing
20 an ice machine and so I think that needs to be kept in
21 account, and then the last area is we're a big
22 proponent of EnergyStar. We've been a very strong
23 supporter. We've worked very hard on that. It's
24 important to us. It's important to our customers.
25 You know, there are, for LEED certification,

1 for utility rebates, for a lot of other reasons,
2 there's dependency on EnergyStar, and so one of my
3 concerns is that if we move efficiency standards out to
4 what's the maximum technology available, there's no
5 room for an EnergyStar category anymore and we're
6 actually right now struggling with, you know, a new
7 EnergyStar Program. We understand, we agree with how
8 that program operates, but, you know, we need to deal
9 with those new efficiency levels, and then I think we
10 just need to make sure everyone keeps in mind what
11 impact that will have on us and that if EnergyStar goes
12 away some time in the future because there's just no
13 more room for further efficiency gains beyond the
14 federal minimums, that's going to be very disruptive to
15 our whole industry.
16 MR. BROOKMAN: Okay. Thank you. Yes, Matt.
17 MR. ALLISON: Matt Allison with Scotsman Ice.
18 I just wanted to piggyback a little bit on what Daryl
19 said there.
20 Another point to consider with ice machines
21 is that our warranty periods are typically longer than
22 most appliances. Most of our products carry a three-
23 year warranty and adopting new technology into the
24 machines, because we use it in a unique fashion, where
25 batch-type machines are very particular where we're

1 cycling every 15 minutes or so, puts stresses on those
2 components that are not typical in most of their other
3 applications.
4 That, combined with the longer warranty
5 period, could have some adverse impact on the overall
6 reliability of our equipment and for us during our
7 warranty period. So I wanted to make sure that that's
8 kept in mind as we go through this.
9 MR. BROOKMAN: Okay. Thank you. I've been
10 told I need to talk louder or something. I'll work on
11 that.
12 Additional comments here at the outset?
13 (No response.)
14 MR. BROOKMAN: Okay. So then let's proceed
15 with the content that is in the presentation slides and
16 you all have a copy of this and first we're going to
17 hear from Detlef Westphalen.
18 Market and Technology Assessment, Screening Analysis,
19 and Engineering Analysis
20 MR. WESTPHALEN: Thanks, Doug. I'm Detlef
21 Westphalen. I'm with Navigant Consulting. I'm going
22 to be talking about the first three assessments or
23 analyses that are part of the Preliminary Analysis:
24 the Market and Technology Assessment, the Screening,
25 and the Engineering Analysis.

1 Starting with the Market Assessment, the
2 Market Assessment is kind of an information-gathering
3 phase of the rulemaking. DOE tries to characterize the
4 equipment market, get an understanding of who the
5 manufacturers are, what the applications are, collect
6 information on the equipment, what types of equipment,
7 what are the configurations, how are they used, and get
8 information on the different efficiency levels, and use
9 some of this information to develop what the product
10 class or the equipment classes would be for the
11 rulemaking.
12 Methods involve information-gathering
13 primarily, you know, from public sources and also from
14 talking to people in the industry, you know, end users,
15 you know, other sources that are available, and then a
16 key part of the Market Assessment is to develop the
17 equipment classes that would be used. You know,
18 different equipment classes would have different energy
19 standards associated with them and so it's important to
20 make sure those classes are appropriately defined.
21 More detail is in Chapter 3. You'll see this
22 bottom bullet here, a detailed description, you know.
23 We haven't put all the detail of all the work that
24 we've done in the presentation. There's more detail in
25 the report which, you know, I hope you'll take the time

1 to read, if you haven't already.
2 Equipment classes. Charlie mentioned EPACT-
3 2005 which established standards for cube-type ice
4 makers. There were 13 covered classes. These are
5 distinguished by, you know, the configurations: the
6 ice-making head in which you have a single package
7 which doesn't include ice storage; self-contained unit,
8 a single package which does include ice storage; remote
9 condensing unit which is a two-part split system ice
10 maker, and those are further divided into the remote
11 units with remote compressors versus the ones with the
12 compressors in the ice-making head portion of the ice
13 maker.
14 Air or water cooling for the condenser is
15 another characteristic that distinguishes equipment
16 classes, and then with each of these categories, there
17 are two or three divisions according to ice-making
18 capacity, from 50 to 2,500 pounds per day, for the
19 existing standards.
20 The existing standards do not cover
21 continuous ice makers. However, for this rulemaking,
22 DOE is considering a total of 25 covered classes for
23 batch and continuous and now, instead of calling them
24 cube ice makers, they'll be called batch ice makers,
25 and this has already been defined in the Test Procedure

1 Rulemaking which recently concluded.
2 And again, Chapter 3 contains a full listing
3 of all the equipment classes. We've repeated it here,
4 and this is our first seeing eye chart and, you know,
5 you have it in front of you, as well, but it gives the
6 relationship, you know, the equipment type, type of
7 cooling, the harvest rate ranges, type of ice maker for
8 the different equipment classes contemplated for this
9 rulemaking.
10 And there's a little bit of an inconsistency
11 in this slide as compared to some of the other, the
12 ice-making head air-cooled large capacity. You know,
13 as you'll see in some of the discussion further, we've
14 done some further separating of that class and we'll
15 get into that a little bit more later.
16 So on equipment classes, we have two requests
17 for comment boxes. The first, we generally seek
18 comment regarding this suggested structure for the
19 equipment classes and then we also have an Item A and
20 just to clarify, we have these comment boxes shown with
21 numbers and letters. We've put them in the
22 presentation, you know, consistent with the material
23 that we're presenting. However, the numbers refer to
24 their numbering in the Executive Summary. The ones
25 that have letters are in the presentation, but not in

1 the Executive Summary. So it's important to look at
2 the presentation requests for comment, in addition to
3 what is in the Executive Summary, for requesting
4 comment.
5 Also under Equipment Classes, we would like
6 to know if there are different types of equipment with
7 significant annual shipments that do not fall under any
8 of the equipment classes outlined that we're
9 considering.
10 MR. BROOKMAN: Charles Llenza.
11 MR. LLENZA: Yes. I just want to make the
12 comment that we included in the back of the
13 presentation under Backup Slides, there's a
14 comprehensive list of all the questions, so you don't
15 have to leaf through the documents, but we wanted to
16 make sure that, at least if you didn't want to do
17 anything else, you could just walk away with the list
18 and come back and maybe file some comments with the
19 department at a later time.
20 MR. BROOKMAN: That's good. Okay. Good. So
21 let's have comments on Item 3 and Item A as listed here
22 in this slide.
23 Tom Eckman.
24 MR. ECKMAN: Tom Eckman, Northwest Power and
25 Conservation Council.

1 While there are numerous equipment classes
2 here, I presume that these will ultimately translate
3 into standards by class. Is that --
4 MR. WESTPHALEN: That's the intent.
5 MR. ECKMAN: -- a reasonable interpretation?
6 So we'd have on the order of 25 different standards in
7 effect one by class and some of these classes span a
8 fairly large range of capacity, and I don't know -- you
9 know, I'm not an ice maker manufacturer, so this is
10 more a question than it is anything else, from the data
11 I've looked at, however, there's a fairly significant
12 range of efficiency across -- within each of these
13 capacity ranges and what generally happens when you
14 have a break point is the break point turns into a big
15 discontinuity over time.
16 When people deal with capacity, they stay at
17 499 instead of 500 or they go to 500 instead of 499
18 just to avoid a particular break point in a standard.
19 So my question is are we setting up a
20 situation where we're going to have rather large ranges
21 that have some discontinuities in efficiency
22 requirements that will cause manufacturers to seek one
23 level of capacity versus another?
24 MR. WESTPHALEN: I can partially respond to
25 that. This is Detlef Westphalen.

1 The intent is that there will be no
2 discontinuities and, you know, that doesn't mean that
3 if you get to a break point where the slope suddenly
4 increases, that there wouldn't be an advantage, but the
5 intent would be that there would be absolutely no
6 discontinuities.
7 MR. ECKMAN: So we might have something more
8 like a curve than a slope intercept?
9 MR. WESTPHALEN: Yes. I don't really -- I
10 mean, people have talked about the capacity break
11 points as defining different equipment classes and, you
12 know, we're strictly using that terminology because
13 there's a different equation, but in my mind, it's
14 just, you know, a relationship that's defined by piece-
15 wise linear equations.
16 MR. BROOKMAN: We have received our first
17 question from someone online who asks: can you explain
18 how DOE determined different harvest rate capacities
19 for each of the equipment classes?
20 I think they're talking about the capacity
21 that's listed here.
22 MR. WESTPHALEN: I'm assuming the question
23 asks how did we select the break points between the
24 equipment class capacity ranges.
25 MR. BROOKMAN: I read to you what's written

1 here.

2 MR. WESTPHALEN: And I'll respond to it based

3 on that understanding.

4 In some cases, these were the break points

5 for the existing equipment classes. We looked at the

6 data that was available to determine whether those

7 break points should change and there was not

8 overwhelming evidence that those should change.

9 For the new equipment classes, particularly

10 the continuous, we initially tried to maintain

11 consistency with the CEE Tier 2 break points, you know,

12 which is the CEE process which, you know, developed

13 their own voluntary standards and in some cases, you

14 know, part of this process is to try to get comment on

15 whether all of those break points make sense,

16 particularly for the continuous classes where this is

17 something new.

18 MR. BROOKMAN: So we have not heard yet from

19 manufacturers what they think about these classes. So

20 Daryl.

21 MR. ERBS: Yeah. I just don't always want to

22 go first.

23 MR. BROOKMAN: That's okay. We welcome

24 precocious commenters.

25 MR. ERBS: Just in terms of a general comment

1 around the equipment classes, I would say I would
2 support the current classification. It's important
3 from my perspective to differentiate between remote
4 condensing where just the condensing section is outside
5 versus the compressor because there are good reasons
6 for those different packaging of equipment based on
7 application and by moving the compressor to the outdoor
8 section, it does have a real measurable -- and I know
9 it was in the analysis -- it has an impact on the
10 potential energy efficiency of the ice machine, all
11 other things being equal.
12 So I would support continuing with that
13 distinction between those two categories.
14 In terms of within a particular configuration
15 classification, where you put a break point or whether
16 you do like EPA did where they went to a power-based
17 formula, I personally don't think it's that important,
18 as long as, you know, there's a reasonable
19 representation for what naturally happens as machines
20 get larger, components become more efficient, other
21 effects become less significant, you know.
22 From my perspective, it's sort of an
23 asymptotic relationship between size and efficiency in
24 a particular category and we would just ask that, that
25 through the analysis, that there not be any real

1 discontinuities or any large discrepancies between sort
2 of the industry mean because I think that is a good
3 representation of how efficiency varies with size.
4 MR. BROOKMAN: Okay. So going back to the
5 comment boxes, the department is seeking comment on
6 what you think about these product classes and also you
7 can see Item A, if there are different types of
8 equipment with significant annual shipments that do not
9 fall under any of the equipment classes considered.
10 Yes, Matt.
11 MR. ALLISON: More of a question. It's
12 broken down here by batch and continuous type. There's
13 also a type of product that we manufacture. It's a
14 continuous ice maker but it also dispenses that ice.
15 It's used in various applications in the field.
16 I wondered if this standard intends to cover
17 those types of machines, also.
18 MR. WESTPHALEN: I'll try to start answering
19 that.
20 That type of an ice machine, you know, the
21 ice-making function of that would be covered under this
22 standard and so, you know, if you can use the existing
23 test procedure to measure the energy use of that ice
24 maker in its ice-making function, you know, then it
25 would be covered.

1 Well, I want to make sure I'm not misleading
2 here. The ice-making function is covered. If there's
3 an issue with the test procedure, then, you know, that
4 needs to be addressed potentially with a waiver but,
5 you know, that kind of a machine would be covered.
6 MR. BROOKMAN: Yes, Mary.
7 MS. HOWE: I was wondering if there was any
8 intention of including the remote-to-rack units.
9 MR. WESTPHALEN: We have a category for, you
10 know, the RCU, you know, within the batch category.
11 Let me just back up here. You know, we have remote
12 condensing and remote compressor and that does not
13 distinguish between a product that would have its own
14 dedicated condensing unit and a product that would not
15 have its own dedicated condensing unit and I know
16 there's been some discussion and I think the direction
17 that DOE is headed is that if you have a product that
18 does not have a dedicated remote condensing unit with
19 which it is sold, that product would not officially be
20 covered under the definition for automatic ice makers
21 which is in EPCA.
22 If it is sold intended for rack connection,
23 but also sold with a dedicated remote condensing unit,
24 then it is covered and its rating would be based on
25 that test with the dedicated remote condensing unit.

1 MR. BROOKMAN: Okay. We also have received
2 another question from online. This is from Mike
3 Maertens and we're going to list those -- we're going
4 to get the names of those who are asking these
5 questions.
6 Mike Maertens asks: EnergyStar has moved to
7 exponential curves and eliminated the break points.
8 Would you consider this?
9 MR. LLENZA: Certainly we'll consider it.
10 MR. BROOKMAN: We should assume you were new
11 to these proceedings. So, of course, the department
12 welcomes your request and wants everything in writing
13 in great detail.
14 Charles Llenza.
15 MR. LLENZA: Yes. Charles Llenza, Department
16 of Energy.
17 We welcome all comments here. So, you know,
18 some of these don't have to be all written down but if
19 you make comments here at these proceedings, we will
20 have a transcript that will become available, also, for
21 the public record.
22 But if things are more elaborate, we would
23 prefer things
24 written down so that we would have that to be able to
25 follow the details more thoroughly through something

1 written down or submitted in writing.
2 MR. BROOKMAN: Okay. Additional comments
3 responding to these two comment boxes?
4 (No response.)
5 MR. BROOKMAN: Okay.
6 MR. WESTPHALEN: Now we get into the
7 Technology Assessment and the purpose of the Technology
8 Assessment is to identify technologies which can be
9 used to improve the efficiency of automatic commercial
10 ice makers and again this is, you know, an information-
11 gathering part of the rulemaking involving literature
12 review, evaluation of detailed information for
13 products, manufacturer brochures, spec sheets, and
14 comments and inputs from stakeholders.
15 And the Chapter 3 in the TSD has a detailed
16 description for each of the technologies that were
17 considered.
18 This table shows all of the technologies.
19 Clearly not all the technologies are applicable to all
20 of the equipment types but it gives sort of a breakdown
21 of generally what equipment types they're applicable to
22 and so the comment box we have here for technologies is
23 whether there are any technologies that DOE should
24 consider that haven't already been listed.
25 MR. BROOKMAN: Tom Eckman.

1 MR. ECKMAN: Tom Eckman. I see going ahead
2 we have the Screening Analysis, so I'm not quite
3 certain where to -- there are technologies that might
4 be considered that you screened out. I'm not sure
5 where to enter into the conversation on that since it's
6 coming up on the next slide.
7 MR. WESTPHALEN: I think this question is, is
8 there something on the big list that --
9 MR. ECKMAN: Yeah. Something on there --
10 MR. WESTPHALEN: -- is missing.
11 MR. ECKMAN: -- that you took out, so never
12 mind.
13 MR. WESTPHALEN: Right.
14 MR. BROOKMAN: Okay.
15 MR. LLENZA: This is Charles Llenza,
16 Department of Energy.
17 I think what Detlef is trying to point out is
18 that did we miss anything on this list? That's
19 basically it, something we didn't know of, or did we
20 cover it pretty much?
21 MR. BROOKMAN: Mary Howe.
22 MS. HOWE: I was wondering on the continuous
23 ice makers why there were several things left off,
24 including the reduced potable water flow.
25 MR. WESTPHALEN: Reduced potable water flow.

1 MR. BROOKMAN: That's a feature in continuous
2 ice makers?
3 MS. HOWE: I think there is -- maybe one of
4 the other manufacturers can answer this. I think there
5 are clean cycles or flush cycles on the continuous ice
6 machines.
7 MR. WESTPHALEN: I guess, I mean, I can try
8 to respond partly to that.
9 Now the Engineering Analysis is conducted on
10 the basis of the Test Procedure which calls for the
11 three 14.4-minute long ice-making measurements,
12 production and energy use. The flushing cycles
13 typically are not within those measurement periods, so
14 they would not -- you know, we can't evaluate an
15 improvement to the measurement that's outside of the
16 Test Procedure.
17 MR. BROOKMAN: Okay. So other comments? I
18 guess we're looking for anything significant that's
19 missing from this list. Anything that comes to mind
20 because we're about to move on?
21 (No response.)
22 MR. BROOKMAN: Okay.
23 MR. WESTPHALEN: All right. So now we get to
24 the Screening. The purpose of the Screening is to
25 screen out the technologies that are not appropriate

1 for further consideration.

2 MR. BROOKMAN: Pardon me for interrupting.

3 We have another question from Mike Maertens. He says:

4 Were hydrocarbon refrigerants considered? This, I

5 think, relates to the previous slide. Were hydrocarbon

6 refrigerants considered?

7 MR. WESTPHALEN: Hydrocarbon refrigerants

8 were not considered because DOE could not identify any

9 particular hydrocarbon technologies that would reduce

10 energy use for this equipment type.

11 MR. BROOKMAN: Daryl.

12 MR. ERBS: Just one other comment. It's not

13 legal to use a hydrocarbon refrigerant in the U.S. Now

14 I don't know. That could change but, you know, at the

15 current time, it's not SNAP-approved. So I don't think

16 it would be appropriate to consider a technology that's

17 not a legal option for us.

18 MR. BROOKMAN: Thank you. Karim.

19 DR. AMRANE: Karim Amrane, AHRI. I want to

20 add a little bit on that.

21 I mean, any refrigerant that is used as an

22 alternative to CFCs and HCFCs have to be approved by

23 EPA and the SNAP Program, and, yes, they did approve

24 some hydrocarbons for household refrigerator

25 application and I believe some commercial refrigeration

1 display cases, but that's about it. So ice makers is
2 not part of it, so you cannot choose legally
3 hydrocarbons in ice makers today in the U.S.
4 MR. BROOKMAN: Okay. Thanks for that
5 amplification. Okay.
6 Yes, Daryl.
7 MR. ERBS: Just one other comment since we
8 brought up refrigerants.
9 You know, we may have to use some
10 refrigerants in the future based on other legislation
11 or influence that, quite honestly, based on everything
12 we know today would probably decrease the energy
13 efficiency of our products, and I will probably get to
14 that later on, but if anything on the refrigerants, I
15 see it as being a step backwards, not forward.
16 MR. BROOKMAN: So now we're going to
17 Screening.
18 MR. WESTPHALEN: Okay. Okay. So there are
19 four regulation-defined screening criteria. First of
20 all, technological feasibility and just to make clear
21 what that means, that means that you have to be able to
22 identify products that are sold that have this
23 technology or prototypes that have been tested that
24 demonstrate the technology.
25 Then some of the other criteria are whether

1 the technology is practical to manufacture, install,
2 and service; whether it has adverse impacts on
3 equipment utility or availability to customers; and
4 whether it has adverse impacts on health and safety.
5 At this stage, we also screened out some
6 technologies for other reasons, such as that they
7 didn't affect the measured energy use using the DOE
8 Test Procedure, and proprietary technologies were also
9 taken off the table at this point, you know, where we
10 were able to identify that there's an issue with, you
11 know, intellectual property.
12 So, this slide shows the technologies that
13 were screened out and the key reasons for their being
14 screened out. This is at the point of the Preliminary
15 Analysis.
16 Some of these technologies we're considering
17 bringing back into the analysis for the NOPR phase and,
18 in particular, some of those include reduced potable
19 water flow, increased condenser water flow, and also
20 potentially technology options to reduce evaporative
21 thermal cycling.
22 MR. BROOKMAN: What was the third one again?
23 MR. WESTPHALEN: The technology options to
24 reduce evaporator thermal cycling.
25 MR. BROOKMAN: Okay.

1 MR. WESTPHALEN: And so we have a comment box
2 on this last one that I mentioned, the reduced thermal
3 cycling in batch ice makers, and looking at the
4 technological feasibility criterion, the only
5 technology that we could identify that is available in
6 products or prototype data for which we have the data
7 is that found in the Hoshizaki batch ice makers, for a
8 low thermal mass evaporator. There are patents on this
9 design. Some of them are fairly old. DOE was not able
10 to definitively determine is there a proprietary issue
11 here or not and so we seek feedback from the
12 stakeholders on whether they have more knowledge on
13 that topic.
14 MR. BROOKMAN: Matt.
15 MR. ALLISON: Regarding the Hoshizaki
16 evaporators, I do know that they've incorporated some
17 design changes recently that they've patented or
18 attempted to patent to improve the performance of the
19 machines overall and based on looking at the patents or
20 the patent applications, it appears that they're really
21 centered around improving the energy performance of
22 those evaporators.
23 So I would say the answer to the question is,
24 yes, there are patents, either active or applied for
25 right now, that would go directly towards energy

1 reduction.

2 MR. BROOKMAN: Thank you. Daryl, go ahead.

3 Daryl, please.

4 MR. ERBS: So obviously intellectual property

5 is a consideration, but I think generally there may be

6 ways to, you know, look at low thermal mass outside of

7 an exact duplication of someone else's designs. So I

8 wouldn't say we couldn't do that.

9 My concern is, I guess, twofold. One is

10 trying to really account for the impact of low thermal

11 mass on the potential energy efficiency. My view is

12 that's a very complicated phenomenon to accurately

13 model and predict and so I would be very concerned

14 about taking results from an evaporator in one machine

15 and trying to simply apply those improvements to

16 another machine because it's a very complex

17 thermodynamic process, and so I would be probably most

18 concerned about just how those assumptions find their

19 way into technology levels and the assumed energy

20 efficiency benefits.

21 The other comment is, you know, there's

22 product utility around all of our machines, the style

23 of ice we make. We all have our particular customers

24 who like what they get from our machines. They have

25 their relative advantages and there's certainly a huge

1 investment on the part of each of the manufacturers in
2 terms of, you know, how they go about making their
3 evaporator.
4 So if it were to drive us to have to do
5 something different, all I can tell you is it would
6 have huge economic impact to us. It would be, you
7 know, a very significant impact, and we would probably,
8 you know, look at other alternatives first. You know,
9 it may not have a very good payback, even though it may
10 result in some improvement in performance.
11 MR. BROOKMAN: Thank you. Tom Eckman.
12 MR. ECKMAN: Yes. I just was wondering
13 whether DOE was considering or would consider the drain
14 water thermal exchange in other applications because it
15 changes the inlet water temperature differentials. It
16 can affect the capacity of the units. So the issue of
17 size becomes -- size and capacity impacts are related
18 here. So there's a synergistic effect because you
19 change the inlet water temperature.
20 So I'd ask you to at least investigate the
21 idea that the reason you eliminated it because it would
22 impact the size of the unit, you may be able to
23 incorporate it inside without increasing the overall
24 size of the unit because you can maintain the same
25 capacity.

1 MR. WESTPHALEN: We would welcome any
2 information on designs that would fit that category, if
3 available.
4 MR. ECKMAN: I don't have any. Like I said,
5 I'm not an ice maker manufacturer but I do know that
6 that phenomenon certainly exists in other applications.
7 So it's just a question of whether the synergistic
8 effect of being able to use -- the inlet water
9 temperature reduction has an ability to maintain the
10 same capacity without increasing the size of the unit.
11 MR. BROOKMAN: You don't know if that
12 specific --
13 MR. ECKMAN: I don't know if that’s specific
14 in this application, but in other applications I've
15 seen where for water heating you can reduce the size of
16 the tank capacity and still maintain the same output
17 because the differential temperature is less.
18 MR. WESTPHALEN: I understand the point.
19 MR. BROOKMAN: You see the list of items that
20 are screened out and the reasons why. Comments,
21 additional comments on this?
22 (No response.)
23 MR. BROOKMAN: Okay.
24 MR. WESTPHALEN: Okay. And again to the
25 Engineering Analysis, there's a lot to cover here.

1 The purpose of the Engineering Analysis is to
2 establish cost efficiency curves which describe the
3 relationship between increase in cost and the energy
4 saved associated with each technology option or
5 efficiency level.
6 The methods in the Engineering Analysis, you
7 know, we typically conduct reverse engineering,
8 purchase some units and look very closely at them and
9 that information feeds into both energy modeling and
10 manufacturing cost modeling. We conduct energy testing
11 according to the DOE Test Procedure with additional
12 measurements to get better understanding of how these
13 units are operating. That feeds into the energy
14 modeling.
15 Then we establish efficiency levels, baseline
16 efficiency levels for the different equipment classes,
17 and intermediate efficiency levels, and then develop
18 assessments to describe the cost impact of the design
19 options and what it takes to get to higher efficiency.
20 The details again are described in greater
21 depth in the Technical Support Document.
22 Generally, DOE talks about different types of
23 analyses, design option analyses, efficiency level
24 analyses, manufacturing cost approach, and we basically
25 use all of these themes in developing the Engineering

1 Analysis. You know, the manufacturing cost models and
2 the energy models were based on different design
3 descriptions, but the results were then characterized
4 at specific defined efficiency levels for downstream
5 analysis, life-cycle cost, and national impact.
6 Most of the rest of this I've already sort of
7 covered. Basically, you know, we conduct this analysis
8 and develop these cost efficiency curves, you know,
9 based on manufacturing cost analysis and energy
10 modeling.
11 This chart generally shows the information
12 flow inputs to the energy modeling and manufacturing
13 cost models output into the incremental cost estimates
14 and then the cost efficiency curves.
15 So now we're going to talk about efficiency
16 levels, first the baseline efficiency levels and then
17 the incremental efficiency levels, you know, at higher
18 efficiency.
19 For the currently-covered ice makers, these
20 we'll call the batch ice makers, we set the baseline
21 efficiency levels equal to the current DOE standards.
22 For harvest capacity beyond the range covered by the
23 current standards, the 2,500 to 4,000 pound a day, we
24 set the baseline levels at a constant energy use for a
25 machine of 2,500 pound per day capacity, basically a

1 flat line out to 4,000.
2 For continuous ice makers, one of the issues
3 here was the ice hardness adjustment that was
4 introduced by the Test Procedure for continuous
5 machines and when the efficiency levels for continuous
6 machines were being developed, we had no data available
7 for the ice hardness of the different machines,
8 although we did have data available for energy use in
9 kilowatt hours per hundred pounds.
10 So in order to develop our initial baseline
11 efficiency levels, we made assumptions for the ice
12 hardness -- 70 percent for flakers and 85 percent for
13 nugget machines -- and as mentioned before, we chose
14 harvest capacity break points consistent with the CEE
15 Tier 2 criteria, a thousand pounds a day for IMH and
16 RCU equipment and 175 pound per day for SCU, both for
17 air-cooled and water-cooled.
18 And the curves, I haven't put all the curves
19 in the presentation, but they're available, you know,
20 the data is in Chapter 5, and they're plotted in
21 Chapter 3 with the available energy use data.
22 Now getting on to incremental efficiency
23 levels, this chart is for the batch ice makers. The
24 efficiency levels are defined as the percent energy use
25 less than the baseline and in some of these cases,

1 these levels correspond to the EnergyStar levels.
2 The baseline efficiency level is defined as
3 EL1, Efficiency Level 1, and then we step up EL2,
4 etcetera.
5 Now you'll see here also we have the max
6 available -- this is the max available found in the
7 databases -- and also the max tech. Now this max tech
8 was developed from our analysis and in some cases the
9 max tech doesn't go all the way up to the max available
10 and in some cases that's because there are design
11 options required to get to a max available that we
12 didn't consider, like making the box 50 percent larger
13 than what's typical for a baseline unit, for instance.
14 So that's the table for the batch ice makers.
15 For ice-making head air-cooled in the large
16 capacity range, we did something a little bit
17 different. The existing standard for these products
18 has a sloping line going out to 2,500 pounds per day
19 and we noticed that there aren't any machines at 1,600
20 pounds or above and we didn't feel it made any sense to
21 continually extend this line down to 4,000 to levels
22 that would be down, you know, at two and a half range
23 at 4,000.
24 So we tried to flatten out this curve the way
25 we did with all the other efficiency levels. However,

1 we can't set a standard at a less stringent level than
2 the current standard. So you can see where we've put
3 the dashed line here for Efficiency Level 2, which is,
4 you know, in the intermediate zone, it's, I believe,
5 nine percent lower than the current standard. At 1,600
6 pounds per day, we said, okay, well, let's flatten that
7 out. Eventually, it hits the existing standard line
8 and it has to follow that down because we can't make it
9 less stringent and then at 2,500 we continue it
10 straight out.
11 Now if you get to an Efficiency Level 3 or 4,
12 it might not have this jog in the line and we realize
13 that this might be purely hypothetical because it may
14 be that nobody will ever manufacture a machine in these
15 large capacity size ranges, but we felt it was
16 necessary at least to establish a standard there, you
17 know, to say, okay, well, here's something reasonable
18 to extend beyond, you know, the existing curve.
19 So we have two, I believe two requests for
20 comments here on the equipment classes. The first one
21 speaks to the difference between remote compressor with
22 an RCU unit and compressor within the ice-making head,
23 and, you know, there's an analysis described in the
24 Engineering Analysis chapter that shows that the 0.2
25 kilowatt hour per hundred pounds of ice and, by the

1 way, this is incorrect as 0.2 kilowatt hours per day in
2 the hard copy write-up, that the 0.2 kilowatt hours is
3 reasonable based on the 25 feet of suction line
4 involved and the pressure drop associated and so we
5 would like some feedback on that assessment.
6 MR. BROOKMAN: Daryl.
7 MR. ERBS: Daryl Erbs, Manitowoc Ice. In my
8 earlier comments, I had indicated by category it made
9 sense. In terms of, you know, the value, I guess, you
10 know, we could look at it further, but it's really
11 driven primarily by just suction line loss which is a
12 function of the thermodynamics of the refrigerant and I
13 don't see any reason why that would change. It's not
14 really affected by any of the technology options. So I
15 guess from my perspective, it's valid. It needs to be
16 there and it's probably reasonable to keep it the same
17 for the new standards.
18 MR. BROOKMAN: Thank you. Tom Eckman.
19 MR. ECKMAN: Tom Eckman. Going back to the
20 max tech versus the maximum available --
21 MR. BROOKMAN: Hey, Tom. Excuse me. Matt
22 wanted to comment.
23 MR. ECKMAN: Oh, go ahead.
24 MR. BROOKMAN: It's in the same stream of
25 comment. Go ahead.

1 MR. ALLISON: Yes. Matt Allison. Scotsman
2 supports keeping these classes separate since they do
3 perform separately in the field and there are different
4 customer desires for those types of equipment.
5 MR. BROOKMAN: Okay. Thanks, Matt. Tom, go
6 ahead.
7 MR. ECKMAN: And we agree with that, too.
8 MR. BROOKMAN: Okay. Good. That helps the
9 department.
10 MR. ECKMAN: Yeah. No debate about that.
11 It's just physics.
12 But it would be helpful, I think, if the
13 department would indicate that where the max tech is
14 sizably less than the efficiency available, that that
15 was due to some technology you screened out
16 specifically and not just -- and I'm concerned in some
17 cases that this -- you get lowest common denominator
18 constraint here where you've got -- this may be related
19 to my earlier comment and others about binning these
20 things into certain capacities, some of which have size
21 constraints and some of which don't, and so when you
22 have a continuous function, this may not show up
23 because some of the units that don't have size
24 constraints can be sized more efficiently, and within
25 less than 500 you've got some that are size constrained

1 and some that aren't and the ones that aren’t can
2 achieve the 20 percent improvement and they may be
3 towards the 499 and the others are less. I don't know
4 what the -- but it may be related to just the binning
5 of the sizes and so if the fact is that the 20 percent
6 in the first category improvement is possible because
7 there's no size constraint, yet the max tech is only 10
8 or 14, then we've got an issue just in setting the
9 standards that end up being driven by the lowest common
10 denominator on the size constraint where it's not a
11 problem for others' equipment. Clear?
12 MR. WESTPHALEN: Yes, yes. I understand your
13 comment. We have a request for comment later on on
14 potential for physical size increase and that touches
15 on exactly what you're talking about. I don't know if
16 we can get good feedback on that comment. Let's wait
17 until we get to that box and we can drill into it a bit
18 more.
19 MR. ECKMAN: If there are models that can
20 achieve almost double the efficiency in the marketplace
21 already, having the max tech size, you know, less than
22 that seems overly-large constraint on design options.
23 MR. BROOKMAN: Tim Ballo.
24 MR. BALLO: Tim Ballo, EarthJustice. This
25 seems like an issue that's come up in other rulemakings

1 where certain design options would lead to a larger
2 product that would then create some extra installation
3 costs that, you know, maybe it doesn't make sense for a
4 standard, but I don't think this is the stage of the
5 rulemaking necessarily where you rule out that design
6 option.
7 MR. BROOKMAN: Okay. Thank you. So you got
8 that, right?
9 MR. WESTPHALEN: Yes.
10 MR. BROOKMAN: Okay.
11 MR. WESTPHALEN: We can move on from this.
12 MR. BROOKMAN: There's quite a bit of content
13 here in Item Number 5. So take a peek again, make sure
14 we've received all the comment that you wish to give on
15 this comment box. Okay, okay.
16 MR. WESTPHALEN: Okay. Then we have a
17 comment box on the large batch ice maker efficiency
18 levels and there are two parts here.
19 Number 1 requesting comment on the intent to
20 use the flat curve for most of these equipment classes
21 in the 2,500 to 4,000 pound per day range and then the
22 second part has to do with the approach outlined in the
23 chart that I described earlier for the IMH air-cooled
24 units.
25 MR. BROOKMAN: Yes, Daryl.

1 MR. ERBS: I guess from my perspective, once
2 you get out into the, I don't know, 2,000+ range in
3 terms of ice-making capacity, if it's not flat, it's
4 very close to flat. I mean, a lot of this is driven by
5 -- probably the biggest impact is compressor efficiency
6 and if you -- and I'm sure Detlef and his team have
7 done some analysis.
8 You know, as you look at compressor EERs,
9 once you get out into integral horsepower, you know,
10 you tend to see smaller and smaller gains in compressor
11 EER once you get above a certain size.
12 The effects on other losses also tend to
13 diminish, you know, fan motor, all the different
14 electrical-consuming devices. Once you get above a
15 certain size, you know, tends to again be relatively
16 the same in efficiency, and our large ice machines
17 typically will end up using multiple evaporators to get
18 to those very large capacities, really for economic
19 reasons, because they're so low volume and we can't
20 afford to make a new evaporator for every size, so
21 we'll just use multiple.
22 So the relative performance of the evaporator
23 doesn't get any better above a certain size. So I
24 guess from my experience and just from my engineering
25 knowledge, I would say that it's actually very

1 reasonable to have a flat efficiency line above a
2 certain size, and I don't know if that's, you know,
3 2,200 or 2,500 or where exactly that falls and we could
4 probably look at that, but I think just, you know, in
5 terms of a general trend, this is the correct approach
6 to take.
7 MR. BROOKMAN: Okay. Thank you. Other
8 comments here?
9 (No response.)
10 MR. BROOKMAN: I guess that's it. Okay.
11 MR. WESTPHALEN: Okay. Now we get into
12 incremental efficiency levels for the continuous ice
13 machines and here I should say there is an error in
14 this chart under Efficiency Level 2 for the IMH air-
15 cooled. There is no EnergyStar at 10 percent as far as
16 I'm aware. I don't know why that got in there.
17 And again, this shows the efficiency levels
18 in a percent energy use less than the baseline. Here
19 we have in a lot of cases higher percentages and that
20 to some extent is based on just the nature of how the
21 baseline was defined, baseline having been defined for
22 continuous as achievable by nearly all the ice makers
23 in the dataset that we looked at.
24 MR. LLENZA: This is Charles Llenza,
25 Department of Energy.

1 The corrections, we'll be submitting another
2 deck on the website with the final corrections on
3 everything. So, just in case you miss something at the
4 meeting here today.
5 I'll also do an e-mail blast with a clean
6 deck with all the updates just for everybody's
7 convenience.
8 MR. BROOKMAN: Thank you. Joanna Mauer.
9 MS. MAUER: Joanna Mauer. Could you say a
10 little bit about for the remote condensing equipment
11 classes why there's such a big difference between the
12 max tech and the max available levels?
13 MR. WESTPHALEN: I would have to say I'm
14 sorry, I just don't have the details in my head right
15 now to respond to that. It's coming back to me.
16 MR. BROOKMAN: Please.
17 MR. WESTPHALEN: Sorry. This 42 percent, I
18 believe, was for a unit that recently has been re-rated
19 at quite a bit higher energy use.
20 MR. BROOKMAN: So maybe you can -- it's in
21 the TSD?
22 MR. WESTPHALEN: I don't think that's
23 mentioned in the TSD. The data point is on the chart
24 in the low lower energy use level, but AHRI has
25 recently published data for continuous machines and a

1 different number appeared for that unit.
2 MR. BROOKMAN: Daryl.
3 MR. ERBS: Yes. I think I have a comment and
4 a question and so on the comment, and this actually
5 applies to the batch as well as the continuous, what
6 I'm missing is the relationship between the efficiency
7 levels and the technology options that go into those
8 efficiency levels.
9 I don't understand how you build those. It
10 almost looks to me that it's just sort of kind of steps
11 upward and it would help a lot to understand if there's
12 a particular methodology to identifying the technology
13 options that can actually get you to those. I'd be
14 able to comment more carefully if I actually understood
15 that. Maybe it's in there somewhere. I couldn't find
16 it, though.
17 And then on the kind of what's available, my
18 only caution would be -- and I believe you corrected
19 these for the calorimetry of the ice, these values?
20 MR. WESTPHALEN: These values, yes.
21 MR. ERBS: But you had to assume one value
22 for flake and one value for nugget because there hasn't
23 been a certification program, there hasn't been, you
24 know, a database that's grounded in some industry
25 association or other thing.

1 So there could be some effect on the validity
2 of some of those values if certain manufacturers' ice
3 was not at the assumed value of calorimetry that you
4 used.
5 MR. WESTPHALEN: Yes. We have looked at the
6 data that is on the AHRI website for the continuous
7 machines with reported hardness levels and looked at
8 the baseline efficiency levels compared to those data
9 and see how those compare with what we did before with
10 the fixed 70 percent and 85 and for the most part, you
11 know, the scatter of those points is very similar to
12 what it was before, here and there, you know, some
13 points have moved around a little bit.
14 Of course, not all the manufacturers have
15 reported that data, unless it's happened recently over
16 the last couple days. So, you know, it would be good
17 to get a good full picture obviously but we are trying
18 to look at that as we move to the NOPR phase.
19 MR. BROOKMAN: So having presented the --
20 let's move to the next slide.
21 MR. WESTPHALEN: One thing I wanted to
22 respond to, you know, I thought that there were tables
23 in the Engineering Analysis chapter that detailed the
24 technology options by efficiency level for all of the
25 directly-analyzed products.

1 MR. BROOKMAN: So that's where the features
2 that would be in each of these levels would be listed?
3 MR. WESTPHALEN: Exactly.
4 MR. BROOKMAN: Okay, okay.
5 MR. WESTPHALEN: And if it's not, I mean
6 that's something that we could post on the website, if
7 it would be useful.
8 Okay. I'll move on. So this is a general
9 comment box catchall for efficiency levels. Any other
10 comments on the suggested efficiency levels, both the
11 baselines and the incrementals?
12 (No response.)
13 MR. WESTPHALEN: Okay. Well, maybe we'll
14 move on.
15 MR. BROOKMAN: Tom Eckman, please.
16 MR. ECKMAN: Yes. Given the disparity
17 between product availability, efficiency levels and, in
18 some classes, at least, I think it's --
19 MR. BROOKMAN: I didn't understand that.
20 Product availability disparity?
21 MR. ECKMAN: Yeah. The disparity between the
22 efficiency of the max tech and the product that's
23 available that's sizably more efficient.
24 MR. BROOKMAN: Yes. Okay.
25 MR. ECKMAN: It certainly would be worth

1 investigating whether the maximum technology level
2 that's being analyzed really satisfies the requirement
3 for max tech, that there is a technology out there
4 that's far superior, somehow it's being not analyzed,
5 and by definition you haven't got max tech defined in
6 the same way I view it. If it's certainly in the
7 product literature as an available product and you're
8 not looking at it, that's not max tech. You may decide
9 not to set it as a standard, but certainly not looking
10 at it as a potential standard and then saying we'll
11 screen it out because it's not available to all parties
12 because it's proprietary design or something like that,
13 that's fine, but it needs to be deliberately screened
14 out.
15 MR. WESTPHALEN: Yes. I'm going to, I guess,
16 try to shed a little light.
17 So one of the things that happens again,
18 especially in our world where we don't have huge
19 volumes and that's led the industry to adopt certain
20 size standards, not only for the ice machines but the
21 bins they sit on, the dispensers they sit on, the other
22 equipment that gets connected to the ice machines.
23 So you will find cases where a particular ice
24 machine is in a relatively large cabinet because for
25 purposes of economy every manufacturer's going to put

1 several different capacity increments into a certain
2 size cabinet. So you may have a small capacity ice
3 machine in a big cabinet. It couldn't quite fit in the
4 smaller cabinet. That one may end up being a very
5 efficient machine, so you can find examples and I think
6 if you look at where they picked out the most efficient
7 machine in a category, you know, it's one model and
8 when you look at max tech or an efficiency level, if
9 the idea is to apply that broadly across all of the
10 machines in a class, then you may not be able to
11 achieve that highest industry level universally across
12 a bunch of models and so I would caution saying, well,
13 just because you can find one example that's at that
14 efficiency level, that it's possible to bring every
15 model up to that efficiency level.
16 MR. ECKMAN: This is Tom Eckman. I would
17 agree with that. I think to satisfy me, that, you
18 know, if it's an outlier with respect to designs or
19 what have you, you know, that's reason to screen it out
20 as not available to the general populous of production.
21 However, if there's, you know, 25 percent of the
22 product that's well above the max tech you're looking
23 at, then we have a different issue or even 10 percent
24 of the product that satisfies that, that doesn’t sound
25 like a specialty or odd ball kind of design.

1 So if it's one data point that's different
2 than a sizable number below max tech in terms of their
3 energy use.
4 MR. BROOKMAN: Okay. Other comments related
5 to this comment box, Item Number 4?
6 (No response.)
7 MR. BROOKMAN: Okay.
8 MR. WESTPHALEN: All right. Moving on, this
9 is a more general slide that answers Daryl's question
10 generally, which design options were considered for
11 which equipment types. It doesn't get into the nitty
12 gritty detail of which ones get you to which levels,
13 but these are the key design options that were
14 considered.
15 MR. BROOKMAN: Let's just give a moment to
16 read this here.
17 MR. WESTPHALEN: Well, let me try to
18 introduce it verbally. This gets into the whole
19 question of if you can get more efficiency by making
20 the box larger and putting in larger heat exchangers,
21 you know, clearly that's a technology option. There's
22 a potential customer utility aspect there, you know.
23 There's the potential for issues if, you know, in a
24 replacement application where it won't fit on the
25 existing bin, but ice maker size affects multiple

1 design options, potentially the drain water thermal
2 recovery, for instance, and so, you know, we could
3 really drill down into a lot of detail here as to,
4 okay, well, you know, it relates also to the flat
5 curve.
6 Well, you know, maybe when you get to 3,000
7 you can put in a box that's twice as large and that
8 would then say that the curve should come back down
9 again and so there are a lot of implications here and,
10 you know, certainly for us to do our best job, you
11 know, the more detail we can get in responding to this
12 issue and what's reasonable in terms of sizes at
13 different levels would be very helpful.
14 MR. BROOKMAN: Daryl.
15 MR. ERBS: So I think I have a two-part
16 answer. So there are some machines which I would argue
17 don't have any flexibility whatsoever. They typically
18 are those machines that go into the drive-through of a
19 fast food restaurant which, quite honestly, they keep
20 asking us to make them smaller so they have more access
21 to them. We're kind of stuck between a rock and a hard
22 place in terms of making them any smaller when we're
23 faced with increasing energy requirements and all that,
24 but really there are seriously issues in terms of the
25 size and including even making it taller. They sit on

1 top of a dispenser. There's a ceiling there. Our ice
2 machine's touching the ceiling today.
3 So the footprint for almost all ice machines
4 is largely constrained by either the ice beverage
5 dispenser that it sits on or the storage bin that it
6 sits on. Those are industry standards. A high
7 percentage of the ice machine business is replacement.
8 It's not that common that the ice machine and the bin
9 are replaced at the same time, but even if they were to
10 replace both of them, if you were to go into most
11 restaurants, hotels, or other food service segments
12 where these products are used, there's a space that
13 that ice machine is wedged into and you can't make a
14 bigger space, right? It's an existing restaurant.
15 There's stuff installed all around it.
16 There, in some cases, is the ability to make
17 them a little bit taller, but I would say that it's
18 something that, you know, really needs to be viewed
19 with caution in terms of how widely available the
20 increase in size is available.
21 Of course, now with the remote condensing
22 unit, there probably is room in a lot of cases for a
23 larger outdoor unit. My only caution there is when you
24 start to make the outdoor unit larger to put more
25 condenser coil in, you now affect the refrigerant

1 management, right? You end up with more volume in that
2 outdoor coil.
3 An ice machine is kind of a funny device in
4 that it's got to run from minus 20 degrees to 120
5 degrees if it's got an outdoor condenser. That
6 presents severe challenges to us in terms of managing
7 all that refrigerant. So if we start putting more
8 refrigerant in to achieve higher efficiency levels, it
9 might affect the indoor unit. I have to put a much
10 larger receiver in now than what I've had in the past
11 and I may or may not have room for that. So it's just
12 a little complicated, and I would be cautious about
13 saying that's an easy design variable to use to
14 increase efficiency.
15 MR. BROOKMAN: Thank you. Matt.
16 MR. ALLISON: Related to remotes in
17 particular, you know, increasing the condenser size,
18 which I assume is where this increased package size is
19 going, a lot of times when we looked at doing this type
20 of thing in the past, it really hasn't yielded a
21 performance enhancement because when you're operating
22 with a more efficient freeze cycle, your compressor
23 runs cooler. When you go to harvest the ice, you have
24 less heat to work with to actually harvest the ice, so
25 the harvest cycle ends up lengthening and the net

1 impact on the overall performance of the machine is
2 little, or in some cases a step backwards.
3 So in the modeling of this and in the
4 consideration of a larger package size, we need to be
5 careful with batch-type machines in particular.
6 MR. BROOKMAN: Thank you. Tom Eckman.
7 MR. ECKMAN: Tom Eckman. This will come up
8 later as we get to the Energy Use Analysis, but it
9 seems that we have very little information on the
10 loading of this equipment, that is, what the actual
11 duty cycle is, how many pounds it produces given its
12 rated capacity. Is it 50 percent loading, which is
13 what's assumed here, or is it some other number?
14 So without that information, it's really hard
15 for me to determine whether or not we're up against the
16 limit in terms of capacity and size that a smaller
17 capacity might satisfy the application, therefore could
18 be more efficient. If it's only being used 50 percent
19 of its capacity, maybe on July 4th it's used a 100
20 percent, but there are applications where this thing is
21 way over-sized for its particular application and
22 therefore you could make it more efficient because you
23 could downsize the capacity, maybe you could make it
24 more efficient.
25 Clearly as you get smaller, you can't always

1 maintain the efficiency. So it seems to me there's
2 that connection between what we don't know, which is
3 how often these units are loaded at their absolute peak
4 capability, and what their annual usage is.
5 MR. LLENZA: This is Charles Llenza,
6 Department of Energy.
7 Does the industry have any kind of standard
8 sizes that they use? Say like, okay, we build them in
9 this size by this size, and this size. Is there some
10 industry standard or some requirements size-wise?
11 MR. BROOKMAN: Matt Allison.
12 MR. ALLISON: This is Matt Allison. Yes,
13 there are. There are standard widths in particular,
14 22-inch wide, 30-inch wide, and 48-inch wide are the
15 standards that most all the machines are built around.
16 You'll find that heights vary a little bit, depending
17 on the machine, but the widths are pretty well set.
18 The depths are also pretty well set. Most
19 manufacturers are between 24 and 28 but, yes, there are
20 standards.
21 Relative to the other point that was made as
22 far as machine sizing, you know, if you look at the
23 energy use on a machine on a per hundred pounds of ice
24 produced basis, it actually goes down as the machine
25 size increases. So when somebody has a situation where

1 they have an ice machine that's too large, they
2 probably have a machine that's running more efficiently
3 than what they would have if they downsized that
4 machine to something smaller for their particular use.
5 So if they use 200 pounds of ice a day, if they use a
6 machine that's only using five kilowatt hours per
7 hundred pounds versus a machine, the smaller machine
8 that maybe uses, you know, eight kilowatt hours per
9 hundred pounds, they're actually better off with the
10 larger unit.
11 MR. WESTPHALEN: I guess I have a follow-up
12 question for Daryl. Is there any way to identify those
13 particular ice machines, the models, that might be
14 marketed specifically to like the drive-in type of
15 scenario?
16 MR. ERBS: I mean, some of them, yes, but we
17 don't have that good of information on where a
18 particular machine gets placed and there's a lot of
19 variability and it's not just drive-in. I mean, I use
20 that as an example, but just our ice-making heads get
21 put into a lot of constrained places.
22 Those of you who stay in hotels will, you
23 know, probably all note when you go to get ice, right,
24 it's sort of stuffed in a broom closet and actually
25 there, you know, it's not just the physical space

1 that's carved out for it but, you know, we have issues
2 with air recirculation and air-cooled machines.
3 You start making it bigger and even though it
4 fits, now you're going to create a lot of recirculation
5 of condenser air which will have a bigger detriment on
6 its efficiency and its reliability, even though you may
7 think you've improved its operation in real life.
8 So, I mean, there are -- I think it would be
9 difficult to really sort that out and to identify it
10 down to a model level. Someone would have to go out
11 and do a lot of study in the field.
12 Just a comment on the ice use, too. I think
13 it's one thing how many hours a year you assume for
14 your life-cycle analysis but in terms of sizing, again
15 this is a replacement business. Our customers really
16 do understand how much ice they need and not being able
17 to serve customers on the 4th of July is a reason to
18 buy a big machine. It's not about the average day,
19 it's about making sure you don't shut down.
20 MR. BROOKMAN: Okay. Additional comments on
21 this issue box?
22 (No response.)
23 MR. BROOKMAN: Okay. Let's move on.
24 MR. WESTPHALEN: Here we have a comment box
25 regarding potable water use minimums for batch ice

1 makers.

2 MR. BROOKMAN: Let me interrupt. I'm sorry.

3 I've been handed another question from online. This is

4 from Mike Maertens. I hope I'm pronouncing his name

5 correctly.

6 It should be noted that larger sizes will

7 increase cabinet costs, also.

8 Okay. Now.

9 MR. WESTPHALEN: Potable water use, as

10 mentioned, for the Preliminary Analysis, we did not

11 consider this in the analysis. However, you know,

12 certainly in some cases there's a potential for energy

13 use reduction associated with reducing the potable

14 water use.

15 There was discussion about the scaling that

16 could occur, you know, if potable water use is reduced,

17 you know, as part of the framework process and so we've

18 looked at some of the data to see what machines have

19 what minimums but we would like to get some comment on,

20 you know, what would be some reasonable minimum levels

21 to assume and should that change by equipment class

22 and, if so, how should that go?

23 MR. BROOKMAN: Matt.

24 MR. ALLISON: We might want to refer here to

25 EnergyStar. They've put use limits on potable water

1 use, and I think it's 25 now, and I think with the
2 revised, they're looking at going to 20 which there was
3 a lot of input that went into that. It's 20 gallons
4 per hundred pounds and that's for the new EnergyStar
5 level. That's, you know, considered the stretch. So,
6 you know, somewhere in that window is probably a
7 reasonable area to work with.
8 MR. BROOKMAN: Okay. Thank you. Daryl.
9 MR. ERBS: Yes. I would echo the same
10 comment, that I think the 20 gallons is something that
11 has been worked through with all the manufacturers and
12 while we're comfortable with that, taking it down any
13 further would, you know, get back into the same concern
14 over how that impacts long-term reliability.
15 You know, one of the considerations, again
16 due to the relatively low volume per model in our
17 designs, you know, we'll use a common water trough
18 water sump for a number of sizes and that causes us to,
19 you know, based on the model, have a little bit of
20 variability in how much water it uses.
21 So if we try to cut it too close for the one
22 that uses, you know, the most water, if we brought that
23 down, then it would drive some of the other models, I
24 think, you know, just below what we feel is acceptable.
25 So I would agree, 20, I think is probably where we're

1 all going to go for EnergyStar reasons and then
2 probably about as low as we're comfortable with.
3 MR. BROOKMAN: Okay. Additional comments?
4 (No response.)
5 MR. WESTPHALEN: Now we get into condenser
6 water use, and condenser water use kind of is a totally
7 different picture from potable water use. Whereas
8 potable water use reduction would improve efficiency,
9 with the condenser water you can increase the condenser
10 water use and improve the efficiency.
11 And we talked about this in the framework
12 meeting, how, you know, potentially there's like, you
13 know, a 3-dimensional analysis here instead of, you
14 know, the two dimensions of efficiency and cost. Here
15 potentially you could consider, okay, well, you know,
16 if you could consider a surface in three dimensions,
17 cost being up, condenser water north, and, you know,
18 energy east, you know, you could say, okay, here we
19 have a surface of costs, you know, that describe
20 different designs and, you know, in the Engineering
21 Analysis we envisioned slicing that surface at
22 different condenser water levels and then passing that
23 information on to the downstream LCC Analysis and let
24 them decide, you know, when it makes sense to jump from
25 one condenser water curve to the next.

1 Basically, you know, when you get to a point
2 where the next design option that you have available is
3 too expensive, it might make sense to take a hit on,
4 you know, the operating water cost in order to get to
5 another efficiency level and rather than taking that
6 approach, you know, what we're suggesting is that we
7 would take some of the LCC considerations into the
8 Engineering Analysis, using average costs for the water
9 and the energy, and essentially order the design
10 options with some consideration of life-cycle costs so
11 that, you know, when you get to a point where the next
12 design option becomes very expensive, then you could
13 say, okay, well, you know, here it makes sense to
14 instead increase the condenser water use.
15 Some background on this slide here, you know,
16 this whole issue of, you know, can the existing
17 regulations for, you know, the cube ice makers be
18 relaxed to allow higher condenser water use and, you
19 know, at this point our understanding is DOE does have
20 that option.
21 Just some other points about this proposed
22 approach. Consistent with the LCC Analysis, this
23 Modified Engineering Analysis, which will consider some
24 of the life-cycle cost aspects, will assume that all
25 water-cooled ice makers are installed in open loop,

1 single pass, pump and dump-type configurations.
2 Essentially, this is, you know, a tool that,
3 you know, we're planning on implementing that will
4 allow us to have some condenser water use optimization
5 in the analysis without requiring multiple development
6 of cost efficiency curves at different condenser water
7 use levels.
8 And this, as mentioned, is described in more
9 detail in the TSD but certainly we would like to get
10 some feedback on it.
11 MR. BROOKMAN: Before we get comments on Item
12 Number 9, we've received a comment from Scott Bingham
13 at Follett who talks about unique technology that his
14 machines use and we'll insert this comment into the
15 record.
16 So now we want comment on Item Number 9.
17 Yes, Karim.
18 DR. AMRANE: Karim Amrane, AHRI. I guess I
19 have a question about expanding the scope to include
20 the condenser water usage here.
21 I mean, when Congress enacted the legislation
22 back in '05 or '07, I don't remember, but the condenser
23 water usage was not part of that. What gives DOE the
24 authority to expand the scope to cover that? I'd like
25 to have legal opinion on that.

1 MR. BROOKMAN: Ari.
2 MR. ALTMAN: Ari Altman, DOE GC's Office.
3 Are you asking what gives -- right now we're
4 considering actually allowing additional condenser
5 water use. Are you asking what gives DOE the authority
6 to consider condenser water use at all or to restrict
7 condenser water use?
8 DR. AMRANE: I guess maybe I misunderstood
9 what the slide says, but I thought the condenser water
10 use was not part of the regulations. It is regulated.
11 MR. WESTPHALEN: Well, it is regulated for
12 batch ice -- cube ice makers currently.
13 DR. AMRANE: That's potable water.
14 MR. WESTPHALEN: Condenser water.
15 DR. AMRANE: Condenser water. Okay. I
16 confused them.
17 MR. WESTPHALEN: A condenser water use
18 standard was established by Congress.
19 DR. AMRANE: Disregard what I said.
20 MR. WESTPHALEN: Okay.
21 MR. ALTMAN: There could be a question,
22 though, because a separate question would be does that
23 extend to other types of ice makers. So it's a valid
24 question and in this case, we're doing something, as
25 Detlef has mentioned, a little unusual, which is

1 considering increasing the water use.
2 So, in fact, this is a discussion that might
3 appear, will probably appear in the NOPR. So it's a
4 valid question. Thank you.
5 MR. BROOKMAN: Yes, Matt.
6 MR. ALLISON: This is Matt Allison. I think
7 it would be fine to use the condenser water use in
8 manipulating the energy of the machine or use it to
9 change the energy of the machine, but again this is an
10 area where the impact on the harvest cycle would need
11 to be considered because of the freeze cycles operating
12 more efficiently, the harvest cycle could be less
13 efficient and we need to net out that performance
14 impact.
15 It would also have an impact on the
16 continuous ice machines. I notice there's a question
17 here about that, also. It could ultimately end up
18 impacting the ice hardness from a continuous type
19 machine, too. So again, that's something else that
20 would need to be considered in the analysis as the head
21 pressure goes up and down.
22 MR. BROOKMAN: Okay. Thank you. Daryl.
23 MR. ERBS: The only other consideration, and
24 again it's just DOE would only look at increasing the
25 limits from where they are today. There's no chance

1 that it could go in the other direction based on, I
2 don't know, water costs changes over time.
3 MR. ALTMAN: This is Ari from the GC's
4 Office. I'll let Detlef also respond to this, but I
5 think the focus of this rulemaking is and this standard
6 is energy use. So what we're saying here is we're
7 considering all options to reduce energy use and one of
8 these options is increasing condenser water use.
9 Now if we could reduce condenser water use to
10 save energy we would also do that, but the endpoint
11 here is reducing energy use rather than reducing
12 condenser water use in this standard.
13 MR. ERBS: Okay. And then the only reason
14 I'm not sure is in the LCC whether the water cost is
15 part of that equation or not, which then, you know, you
16 bring in, well, what's -- because where we see the real
17 benefit in water-cooled are closed-loop systems and,
18 you know, we're seeing an increasing number of closed-
19 loop systems used out there and I know that's
20 problematic for DOE because you can't control how an
21 ice machine gets installed, whether it's an open-loop
22 or a closed-loop application, but that's -- the only
23 other caution is there's one other constraint on water-
24 cooled condenser and that's typically there's a maximum
25 velocity that you cannot exceed or you'll drastically

1 shorten the life of the water-cooled condenser due to
2 erosion.
3 So, you know, we have limits and I would make
4 sure that in your technical analysis you understand
5 those limits and don't drive designs into a region
6 where they wouldn't be reliable.
7 MR. WESTPHALEN: Okay.
8 MR. COOKE: This is Alan Cooke at PNNL. Just
9 to respond to something Daryl said, he could see me
10 nodding my head, but I don't know if everyone on the
11 webinar could.
12 We are taking into account the water costs in
13 the LCC and that's also what Detlef was trying to
14 accomplish by bringing that into the Engineering
15 Analysis because water right now is really a big part
16 of the life-cycle cost of these machines. So if you do
17 change that, the energy savings might have to be pretty
18 substantial to pay for that water. So we are taking
19 that into account.
20 MR. WESTPHALEN: And just echoing what Ari
21 said, you know, this is about energy savings and so,
22 you know, we're not assessing water savings as part of
23 the rulemaking.
24 MR. BROOKMAN: We have received another
25 comment from someone on the Web. This is from Steven

1 Schaefer from Hoshizaki America and he writes: potable
2 water use varies from location to location, based on
3 water quality. We utilize water consumption figures
4 for safety of our machines. Potable water use should
5 not be taken too low to be detrimental to quality of
6 machines.
7 So additional comments? You see the comment
8 box there. Joanna.
9 MS. MAUER: Joanna Mauer. I should have made
10 the comment when the comment box was up, but going back
11 to the size issue, I just wanted to say that without
12 seeing an analysis of incorporating size increases,
13 it's hard to evaluate what the utility impacts would be
14 and also what the potential savings would be. It's
15 certainly an appropriate consideration.
16 Kind of one recent rulemaking on room air
17 conditioners, kind of size and weight increases were an
18 issue that was raised and I think the approach that DOE
19 took in that rulemaking was to kind of evaluate two
20 different scenarios where I think in one the size of
21 the air conditioner was fixed and one it was allowed to
22 increase, and I think that approach allows stakeholders
23 to kind of look at what the impacts are, both, you
24 know, utility impacts and potential savings from that
25 size increase.

1 So I think it's helpful to see analysis and,
2 as Tim said, not to kind of screen out those options at
3 this point.
4 MR. BROOKMAN: Charles Llenza.
5 MR. LLENZA: Yes. This is Charles Llenza.
6 Based on what I've heard about the limitations on size,
7 there's a range, but the box is pretty fairly
8 consistent. So I guess we could do analysis based on
9 dimensions that we've been provided today with, right?
10 MR. WESTPHALEN: Yes. I mean, we have done
11 some careful looking at the data that we have available
12 of efficiency versus size, efficiency versus plan area
13 and things like that, and, you know, what I learn more
14 and more in working on the ice makers is that this is a
15 much more complicated piece of equipment than many of
16 the others that DOE is regulating.
17 For instance, for Room AC it was pretty
18 straightforward as you get larger -- you know, it's
19 pretty much monotonic. You don’t have this issue of,
20 for instance, when the condensing temperature goes
21 down, you might not get the benefit that you expect.
22 We can take a more careful look at that but,
23 you know, it is complicated and, you know, we may not
24 come up with a very clear story within the constraints
25 of the rulemaking schedule that we're trying to attain.

1 MR. BROOKMAN: Let me get a temperature read
2 here. We have about four more slides or so before we
3 will reach a reasonable break point to take a coffee
4 break, but we've been at this about an hour and 45
5 minutes, which is typically about long enough. So we
6 can take a break now, if that serves folks' interests,
7 or we'll just keep going. What's your preference? No
8 serious discomfort. We'll keep going. Okay.
9 MR. WESTPHALEN: All right. So we're done
10 with the condenser water. I think I just have a few
11 more slides here anyway, so we should at least push on
12 through that.
13 Manufacturer Markup. The Engineering
14 Analysis initially focuses on manufacturing production
15 costs and then we apply a manufacturer markup to get to
16 a value that is the manufacturer's selling price, MSP,
17 and in each industry, you know, the markup which
18 incorporates, you know, the overhead, you know, is
19 different and it includes sales and marketing, research
20 and development, shipping paid by the manufacturer,
21 etcetera.
22 For this rulemaking, we developed a
23 manufacturer markup factor of 1.25 and so we have a
24 comment box here asking whether that's an appropriate
25 markup factor.

1 MR. BROOKMAN: You could say something like
2 close or not close. So additional comments related to
3 this?
4 (No response.)
5 MR. BROOKMAN: Okay.
6 MR. WESTPHALEN: The next couple of slides
7 give sort of a top-level snapshot of a lot of the
8 results and I'm not going to get into this in too much
9 detail. Certainly, if you have particular questions,
10 you can ask them, but these are the initially-developed
11 costs at different efficiency levels for the different
12 equipment classes, including the max tech level.
13 This is for the batch ice makers and this one
14 here for the continuous.
15 MR. BROOKMAN: Yes, please. Daryl, please.
16 MR. ERBS: Again, I'll go back to my earlier
17 comment that I'm still not quite sure what goes into
18 each one of those. So to the extent that you could
19 make that available, I think we'd be able to give you
20 more meaningful feedback.
21 It does strike me, if you go back to the
22 batch one, a bit odd. Some of the changes from the one
23 efficiency level to another versus size, they're just a
24 little discontinuous. So that, you know, again tells
25 me there's something different going on for a

1 particular efficiency level category for a particular
2 size machine because the cost goes up a lot more in
3 some cases than it does in others and I'm not sure I'm
4 comfortable with that.
5 So again, I'd like to have more information
6 available and maybe if we had a little better insight
7 we could provide a little better guidance to the
8 department as to what we think might be more
9 reasonable.
10 MR. BROOKMAN: If you think that you've done
11 the analysis, you can say for this step between EL3 and
12 EL4 for one of these categories that you would
13 attribute certain kind of characteristics or
14 attributes. You've done that analysis?
15 MR. WESTPHALEN: We've done that analysis.
16 We have the data. I don't remember the details for
17 each of these.
18 MR. BROOKMAN: You can make that available.
19 MR. WESTPHALEN: We can make that available.
20 MR. BROOKMAN: Okay.
21 MR. Llenza: This is Charles Llenza. My
22 apologies. We should have put that out there because
23 it is important to see what the mix of options are on
24 how to get there.
25 MR. WESTPHALEN: Generally, we do that in the

1 TSD, sometimes in Engineering Appendix, and maybe it
2 just didn't happen this time.
3 MR. BROOKMAN: Okay. So then, yes, Karim.
4 DR. AMRANE: Karim Amrane, AHRI. I guess
5 when I look at those numbers, I kind of immediately
6 have this reaction to say, well, I can get 20 percent
7 improvement for 50 bucks basically is what it is,
8 right? I mean, it's what you're showing on this chart,
9 and, first of all, have you -- I know that this is
10 manufacturer cost, but even if you put the markups, you
11 put the entire markup through, okay, manufacturer,
12 contractor, whatever, have you done any checking of
13 those cost increases? I mean, have you looked at the
14 delta? Have you gone out and looked at how much a 15
15 percent, 20 percent increase in efficiency will get you
16 in terms of --
17 MR. WESTPHALEN: You mean looking at the
18 retail costs?
19 DR. AMRANE: Absolutely. To compare what
20 you're saying here with what exists in reality, what's
21 being sold today. I mean, are you --
22 MR. WESTPHALEN: We haven't done that.
23 Generally in the Engineering Analysis, if that data is
24 available in a way that we think it's meaningful, then
25 we look at that and we try to ask ourselves, well, why

1 is this different?
2 DR. AMRANE: I mean, have you done -- have
3 you questioned those numbers, the $50, and say, well,
4 it looks very low or very -- I mean, for 50 bucks, you
5 can get 20 percent. I mean, it's a great deal, and
6 have you at least went out and said, okay, is this
7 really the case? Am I getting that low --
8 MR. WESTPHALEN: As I say, you know, we don't
9 -- you know, I mean, we would welcome, you know,
10 typical sales price data from the manufacturers for
11 each of their models so that we could really, you know,
12 do a good assessment but, you know, a lot of that
13 information is tough to get.
14 DR. AMRANE: No, no. But again, retail
15 prices are available. I guess just to be on the safe
16 side here, just to say, okay, fine, I have estimated
17 that price, that cost increase, now let's go and let's
18 see what's available in the market and see whether it's
19 close. I mean, am I right?
20 MR. WESTPHALEN: Well, you know, the other
21 thing is that ice makers aren't necessarily sold just
22 on efficiency and so there are price differences that
23 aren't associated with efficiency differences and this
24 happens in all the rulemakings.
25 For instance, you know, EnergyStar

1 refrigerators, you know, they don't just have
2 EnergyStar, they also have additional features that the
3 baseline units don't have. So that, you know,
4 sometimes it's very tough. Even if we did that, answer
5 the question, no, we haven't meticulously gone through
6 that, but even if you did that, you wouldn't
7 necessarily, you know, answer the question.
8 DR. AMRANE: Still, you're basing a standard
9 on that. So that's what I'm saying. I mean,
10 eventually, those cost efficiency curves will determine
11 which efficiency level DOE is going to pick which will
12 be cost effective. What do we mean by cost effective?
13 I mean, if it's not what consumers are paying at the
14 end of the day, that's for me, that doesn't mean
15 anything.
16 MR. WESTPHALEN: Well, that's why we have,
17 you know, this open process where we put the numbers in
18 front of people and we try to get feedback and the more
19 indepth feedback we can get the more we can say, okay,
20 well, yeah, I agree a high-efficiency compressor does
21 cost that much more than the low-efficiency compressor,
22 etcetera, etcetera.
23 MR. BROOKMAN: Daryl.
24 MR. ERBS: So as long as Karim opened up the
25 topic, I mean, actually in the Executive Summary there

1 was one table I found where you did give some specific
2 manufacturer production cost information relative to
3 some energy use reduction. Again, I still don't know
4 how it ties to those specific levels because these
5 numbers weren't nice five percent increments but some
6 of your assumptions are just off somewhat, other ones,
7 quite honestly, I either want to hire the department
8 for my purchasing people or I don't know where you guys
9 -- you know, to give you an example, going from a PSC
10 motor to an ECM motor is $4 and I challenge you to get
11 me a quote from a manufacturer of an ECM motor that's
12 only $4. I mean, we look at them all the time.
13 They're twice as much. They're not $4 more.
14 Even the condenser coil in some of the other
15 assumptions, they're off. I don’t know that it will
16 completely change your analysis, but we really -- and I
17 don't know how to help you. I'm not at a point where I
18 can, you know, give you my cost of bill of materials so
19 you can really see what I pay but I think we have to
20 work on how we give you some guidance so you're more in
21 the ballpark in terms of what these technology changes
22 really cost someone who manufactures at the volume we
23 do with the specific type of components that we need to
24 use for our ice machines.
25 MR. LLENZA: This is Charles LLENZA,

1 Department of Energy.
2 Two things. Anything that we're proposing
3 today, if we're not within the ballpark, you're more
4 than welcome to criticize, but in criticizing, also
5 please provide a more accurate figure. If it's double,
6 if double is a better estimate, then please tell us so.
7 In addition, you can send us confidential
8 information that the department will not publish that
9 we'll use internally just to do these estimates and we
10 can use the numbers without disclosing whom we got the
11 information from. So you can mark information that you
12 could say is proprietary or company confidential, but
13 we can then use that information to put out more
14 realistic numbers on incremental cost of equipment
15 based on features or options that were chosen for that
16 equipment. So we're more than willing to change
17 anything here. That's what I'm trying to say.
18 Tell us what you think it is and tell us what
19 you know, we're fine. We'll take the criticism if
20 we're completely off, this is part of the proceedings.
21 MR. BROOKMAN: Karim.
22 DR. AMRANE: Karim Amrane, and again it's
23 just if I were DOE, I think I would at least go out and
24 see what's going on and look at those regional prices
25 and see whether you are close or you're not close.

1 Those products exist in the market. You can get those
2 prices and see, I mean, because eventually, as I said,
3 you're establishing a level that you would say is cost
4 effective for consumers but again if there's a big
5 difference between what DOE is estimating versus what's
6 available on the market, I mean, I think that has
7 somehow to be corrected.
8 Going back to the Table 3.3 on the TSD,
9 Executive Summary, it says, for example, that you are
10 increasing the condenser by two inches. Now when you
11 did that, I mean, are you also assuming that the
12 condenser will fit in the existing cabinet or have you
13 looked at that?
14 MR. WESTPHALEN: Yes. I mean, we didn't say,
15 okay, well, the condenser doesn't have any room for
16 growth and obviously there's a judgment call there and,
17 you know, somebody else might look at it and say, well,
18 no way, you know, it's too big already, but we didn't
19 make these assumptions without judgment.
20 DR. AMRANE: So it assumes that you increase
21 the condenser, it will fit in the existing cabinet, you
22 won't have to increase the size of the cabinet, for
23 example, to accommodate that new condenser.
24 MR. WESTPHALEN: That was the assumption for
25 all of the preliminary analyses. The ice-making head

1 portion would not have to grow.
2 MR. BROOKMAN: We've received a comment from
3 Steven Schaefer who says: We would like actual
4 examples for the cost for efficiency. These numbers do
5 not look accurate.
6 So, once again, following Charles Llenza's
7 comments, some way to get that information to the
8 department. They just mark it confidential and then
9 you'd be able to hold it. It would not be FOIAble?
10 MR. LLENZA: That's correct. Charles Llenza,
11 Department of Energy.
12 Yes, that's correct. You can send the
13 comments as part of the public comment period into the
14 department or at any time and what we do is we put a
15 placeholder in the public part of the docket and the
16 specific information/comment is removed, but it's used
17 internally to tweak the numbers or get the analysis
18 correct for better and realistic industry numbers.
19 MR. BROOKMAN: And then if you had multiple
20 comments from multiple manufacturers and a certain
21 sample size that would mask individual companies, then
22 you could kind of blend that into your final --
23 DR. AMRANE: Yes, that's correct. What
24 happens is pretty much the information is used,
25 stripping out the source.

1 MR. BROOKMAN: Thank you. Please. Go ahead.
2 MR. BARRINGTON: Hi. This is Ben Barrington
3 from Navigant Consulting.
4 Additionally, there's an opportunity for
5 manufacturers to provide this type of information on a
6 confidential basis to Navigant Consulting as part of
7 our Manufacturer Impact Analysis interviews which we'll
8 conduct later as part of this rulemaking. I'll go into
9 greater depth on that later in the afternoon.
10 MR. BROOKMAN: When would you commence those
11 interviews about?
12 MR. BARRINGTON: Soon.
13 MR. BROOKMAN: Okay. Good.
14 MR. BARRINGTON: Thank you.
15 MR. BROOKMAN: Mike Maertens, if I'm saying
16 his name correctly, writes: We agree with Daryl. In
17 our opinion, the table is optimistic at best. Many
18 times changing one component will require changing
19 other components that will affect costs. So thanks,
20 Mike, for that.
21 Okay. Yes, Matt.
22 MR. ALLISON: I was just wondering, as part
23 of the standard process, there's obviously a model
24 that's driving a lot of these numbers as far as
25 increased efficiencies. Is there an intent at some

1 point to validate that model by actually putting one of
2 these changes on a machine and validating that it
3 actually performs as it's forecast to perform?
4 MR. WESTPHALEN: Well, as part of the work,
5 you know, we do calibration of the model with, you
6 know, existing models that we have and have tested.
7 Obviously you've got much more data than we have in
8 terms of being able to do that.
9 MR. BROOKMAN: Okay.
10 MR. WESTPHALEN: Regarding the comment on
11 motor costs, I believe the Engineering TSD provides a
12 very detailed, you know, list of assumptions for motor
13 costs and we haven't specifically put that up with
14 requests for comment but that's something where, if you
15 can provide indication, maybe not of, you know, total
16 costs or maybe just the incremental costs, you know,
17 that would be very helpful, as well.
18 MR. LLENZA: This is Charles Llenza,
19 Department of Energy, again.
20 Everything is subject to comment. So if
21 you're looking through any of our analysis, or
22 numbers,orselections here or assumptions and they are
23 just off base, just because we provided you a list, you
24 don't have to stick to that list of questions that
25 we're asking you. We're certainly not the experts.

1 We're trying to become the experts to the best of our
2 abilities here through this pre-anlaysis and through
3 your expertise, through the rulemaking process in order
4 to come up with these standard levels of efficiency for
5 this equipment. So anything that you see throughout
6 these documents that we're just not getting right, we
7 welcome comment from the participants here and from
8 those people that are online.
9 MR. BROOKMAN: Matt Allison.
10 MR. ALLISON: Matt Allison with Scotsman.
11 Another thing that I think is going to be a challenge
12 as we go through and model these things, like you can
13 put in a two-inch wider condenser and assume that it
14 doesn't make the cabinet size go up. The way it plays
15 out, at least in our product line, is I mentioned those
16 standard cabinet widths before, we have a 30-inch
17 cabinet width and at a particular height, we satisfy
18 300 pounds, 400 pounds, 500 pounds, and 600 pounds of
19 ice out of that same cabinet size.
20 The reality is in a 300-pound machine, we can
21 add two inches of condenser without changing anything
22 else and that works fine. A 600-pound machine, we're
23 using up every single inch of space in that cabinet
24 that we possibly could to get that 600 pounds out of
25 that machine and in going to a two-inch wider condenser

1 in that same box size is not feasible for us, so to
2 keep that same 600-pound machine which is a defined
3 market price point in a market segment, we have to bump
4 that machine up to a larger box size, not necessarily
5 wider but taller, and in doing so, all of a sudden it
6 becomes less competitive.
7 This putting it on top of a dispenser and
8 fitting under a soffit in a convenience store, we can
9 no longer fit. So we've just lost that business to a
10 shorter machine. So I think making statements or
11 modeling where we can do a two-inch wider condenser and
12 it's going to result in X amount of savings, that may
13 be true on some models, it may not be true on others.
14 It's just something that needs to be considered in the
15 whole process.
16 MR. WESTPHALEN: Just one thing I'd like to
17 bring up. I know that you might recall in the
18 framework meeting, we brought up the possibility of the
19 industry getting together and, you know, maybe, you
20 know, Karim's organization collecting data and
21 consolidating it and then providing it to DOE and, you
22 know, we realize that that's a very time-intensive
23 process and there have been issues with that in the
24 past, but, you know, it's not like we don't want to try
25 to get that information, you know. There are issues on

1 how to get it obviously and, you know, we would be
2 willing to collect that under non-disclosure agreement
3 if you're willing to try to develop it at enough of a
4 level that we could really feed into the analysis and
5 then, you know, obviously consolidate so that, you
6 know, we could play that role.
7 MR. BROOKMAN: It could go directly to
8 Navigant.
9 MR. WESTPHALEN: Correct.
10 MR. BROOKMAN: Karim.
11 DR. AMRANE: Karim Amrane, AHRI. I
12 appreciate the offer, but as you know, we went through
13 that before and we did, not for this rulemaking, for
14 other rulemakings, and we did develop those costs and
15 DOE at the end opted not to use them in the rule.
16 Okay? So we don't want to go again through that
17 because we spent a lot of time gathering that
18 information and at the end it was not used by DOE
19 because for reasons you felt it could be challenged and
20 so on. So I don't think that's a good option.
21 One good option, however, is to go out and
22 look at those retail prices because they exist and you
23 can at least look at that and see whether your analysis
24 compares well or not. That's all.
25 MR. LLENZA: This is Charles Llenza,

1 Department of Energy, again.
2 Through the manufacturing interviews, I
3 think, we'd be more than willing to listen to what
4 people have to say about these items, too, also, as
5 we're going through and talking to different companies
6 about pricing and options and particulars about their
7 equipment, etcetera, and that information, my
8 understanding, remains confidential. It's not
9 disclosed.
10 We use the generic information in developing
11 and tweaking our analysis. Sothis is again
12 preliminary. This is why it's called preliminary and I
13 also think, you know, the more input we get from the
14 industry, the better we will be at a later stage here.
15 MR. BROOKMAN: So this is the final -- oh,
16 I'm sorry. Tim.
17 MR. BALLO: Tim Ballo, EarthJustice. The
18 issue of cabinet sizes has come up several times this
19 morning and without actually endorsing the idea of
20 using cabinet size as an additional product class
21 defined in the criteria, I'm wondering if that's maybe
22 where this has to go. If the existing standard cabinet
23 sizes that the industry has do both provide a utility
24 to the consumer and serve as a real constraint on the
25 efficiency of products. That's typically what the

1 department has used to identify product classes.
2 MR. BROOKMAN: Okay. Thank you. Daryl.
3 MR. ERBS: Just to shed more confusion on
4 that topic. Sorry. So we do make ice machines in
5 different cabinet sizes that deliver the same ice-
6 making capacity. So that's helpful. I can see that
7 getting complicated, you know, how you would sort that
8 out, I guess. So just food for thought.
9 MR. BROOKMAN: Joanna.
10 MS. MAUER: Joanna Mauer. Daryl, could you
11 just comment a little bit on kind of the reason for the
12 different cabinet sizes for a given capacity?
13 MR. ERBS: Yes. Again, it's we're more in a
14 position to conform to other people's decisions. So,
15 you know, a lot of the small narrow ice machines go on
16 top of ice beverage dispensers and those are narrow
17 because they go on countertops and people have limited
18 countertop space and so, you know, we have to make an
19 ice machine that's not wider than the ice beverage
20 dispenser that it fits on or the whole idea of a narrow
21 ice beverage dispenser, you know, has really kind of
22 lost its value to the customer. So that that's one
23 example.
24 The other common example is just ice storage
25 bins and an ice machine really needs to be the same

1 size as the opening at the top of the ice storage bin
2 or it gets very awkward and in some cases it's
3 dangerous, you know, if you try to put an ice machine
4 that's bigger than the ice storage bin, it's now an
5 unstable situation.
6 Those ice storage bins are really sized based
7 on kind of common categories of how much ice does a
8 particular type of end user require today and so it's
9 volume-related and the industry has fortunately worked
10 out some common sizes. So it's now possible for a
11 customer to buy an ice machine from company A and put
12 it on an existing bin or on a new bin from company B
13 and they're interchangeable and I don't think the
14 industry would fare very well if we tried to undo that.
15 I mean, it's worked very well.
16 MR. BROOKMAN: Detlef, have you described
17 this Slide 43 yet?
18 MR. WESTPHALEN: Slide 43, yes. It's
19 essentially the similar slide to the one previous, just
20 for continuous machines.
21 MR. BROOKMAN: Just for continuous. I
22 gotcha. Okay.
23 So comments on what you see here because
24 we're about to take a break and we can return if there
25 is additional information, additional things to be said

1 on this Slide 43, this big chart, after the break, if
2 there's additional comment there.
3 (No response.)
4 MR. BROOKMAN: So let's take a break now.
5 It's 10 minutes after 11. We're going to take a 15-
6 minute break. We're better than halfway done, a little
7 more than halfway. It's quite conceivable we'll push
8 straight through lunch, if we are in range. We don't
9 want to truncate anybody's opportunity for comment.
10 We'll keep going as we need to. So it's possible we'll
11 run till, say, 1 o'clock continuously and finish early.
12 However, we might keep going, just so you'll know.
13 It's 11:10. We'll return at 11:25. You must
14 wear your badge above the waist inside the Forrestal
15 Building. There are restrooms on both ends of the
16 hall. There's a coffee shop down on the ground floor.
17 Please go quickly if you're going for coffee.
18 Sometimes they're stacked up down there.
19 Okay. So thanks. We had a really good start
20 on the day, lots of good content here. We'll see you
21 back here at 11:25.
22 (Recess.)
23 MR. BROOKMAN: Okay. One or two individuals
24 have joined us that didn't get a chance to introduce
25 themselves this morning. So let's have those

1 individuals do that now. Use the microphone and say
2 your name and organizational affiliation.
3 MR. STARR: Louis Starr with Northwest Energy
4 Efficiency Alliance.
5 MR. BROOKMAN: Thank you. Anybody else who
6 we missed this morning? Yes?
7 MR. CARMICHAEL: Rob Carmichael, Navigant
8 Consulting.
9 MR. BROOKMAN: Okay. Thank you. Okay. Now
10 we're going to have Markups Analysis. You can see it
11 listed there on your Agenda. Alan Cooke.
12 Markups Analysis, Energy Use Analysis, and Life-Cycle
13 Cost and Payback Period Analysis
14 MR. COOKE: Good morning. My name's Alan
15 Cooke, and I'm with Pacific Northwest National
16 Laboratory.
17 So I'm here today to talk about Markups,
18 Energy Use, the Life-Cycle Cost and Payback Period
19 Analysis.
20 The purpose of the Markup Analysis is to take
21 the manufacturer's selling price that we receive from
22 the Engineering Analysis and translate that into the
23 sales price that's actually paid by a customer who buys
24 the equipment. In essence, we're adding on costs for
25 the wholesale and the dealer ends of this market.

1 We define the market with three different
2 market distribution channels, the first one being the
3 national accounts channel which is directly from the
4 manufacturer to the customer, the second one being a
5 wholesaler channel which goes from the manufacturer to
6 a wholesaler who then sells directly to the customer,
7 and the third being what we're calling here a dealer
8 channel which is manufacturer to wholesaler to a dealer
9 or contractor.
10 At the framework meeting, we presented these
11 three channels and we were told they sounded okay as
12 far as describing the market but the one thing that we
13 heard was that there is almost no volume that goes
14 through the national account channel -- we had a much
15 bigger number that we presented in the framework -- and
16 that most of it goes through this third channel which
17 we're calling the dealer channel.
18 Since then -- well, actually, this came out
19 almost exactly the same day that we had the framework
20 meeting -- the Census Bureau issued a report that shows
21 for the commercial refrigeration NAICS Code as a whole,
22 distribution looks somewhat along these lines where
23 most of it is going through a dealer channel, about a
24 third of it is going through a wholesaler channel, and
25 a small amount going through a national accounts

1 channel.

2 So the question I want to ask here to the

3 parties present: does this distribution look

4 reasonable? This is, I should add, applied to all

5 equipment. Something else we heard at the framework

6 meeting is that the different types of equipment do not

7 require a different percentage. They all pretty much

8 go through the same market channels.

9 MR. BROOKMAN: All ice-making equipment?

10 MR. COOKE: All ice-making equipment.

11 MR. BROOKMAN: And this pie chart reflects

12 2007?

13 MR. COOKE: That's the most recent Census of

14 Manufacturers data.

15 MR. BROOKMAN: Okay. So what do you think?

16 Is this pretty close? Charles Llenza.

17 MR. LLENZA: This is Charles Llenza,

18 Department of Energy.

19 Go back to the previous slide. First thing

20 is to note that we have made the correct assumptions

21 here on the flow for each one of these distribution

22 channels. That's the first thing that we want to make

23 sure that we got right, and then from that, when you

24 look at the next slide, then that shows the percentages

25 of what that distribution flows for each one of those

1 shows.
2 So the question is kind of a little tricky
3 because it assumes that we have gotten the distribution
4 channels correct on the previous slide.
5 MR. BROOKMAN: And so maybe those in the room
6 that know about it could confirm what was said in the
7 framework meeting, that those general distribution
8 channels are, what did you say, pretty close?
9 MR. COOKE: Pretty close, reasonably
10 accurate.
11 MR. BROOKMAN: What about that? Does it look
12 right? Before we talk about numbers.
13 MR. ALLISON: This is Matt Allison, Scotsman.
14 I'd say that the channels themselves, I don't know, I
15 think, like the national account channel, for instance,
16 we don't sell anything directly to a national account.
17 We'll negotiate pricing with the national account and
18 then they'll direct it through a kitchen equipment
19 supplier who is part of the mix then at the end of the
20 day, too. So it actually, even though it's a national
21 account, it looks more like what you have described as
22 the wholesaler channel.
23 So there's, you know, different ways to
24 market, I guess, than what's shown here. I don't know
25 that that national account channel, as it's shown, is

1 accurate.

2 MR. BROOKMAN: Although in the pie chart, it

3 reflects it's a very small amount, only six percent.

4 So, conceivably, --

5 MR. ALLISON: Yes. As far as the breakdown

6 goes in the weighting, I think we might be able to give

7 you something there on a confidential-type basis.

8 MR. BROOKMAN: Okay.

9 MR. LLENZA: Okay. Great.

10 MR. BROOKMAN: Thank you. Other comments on

11 the distribution channels before we talk about the

12 percentages?

13 (No response.)

14 MR. BROOKMAN: Nothing additional there. Go

15 ahead, Daryl.

16 MR. ERBS: I'm not sure it's that relevant to

17 your analysis. I mean, the only other kind of unique

18 channel is where we actually sell equipment to someone

19 who leases it to the end user. I mean, that's probably

20 grown a little bit in history. I don't know. I mean,

21 it's basically like a dealer channel, except instead of

22 selling the equipment, they just lease it. So, I mean,

23 that's the only thing that I don't see represented here

24 that occurs.

25 MR. LLENZA: This is Charles Llenza,

1 Department of Energy.
2 Is it any different in terms of costs?
3 MR. ERBS: The pricing would be similar, you
4 know, based on kind of, you know, how much they buy
5 kind of usually sets what kind of price they get. So
6 it really doesn't affect too much the sale price of the
7 equipment then to that individual. They just don't
8 sell it to the end customer at the end of the day.
9 MR. BROOKMAN: It's, though, the same sort of
10 distribution.
11 MR. COOKE: Daryl, do you think that that's
12 -- has that achieved a measurable market penetration?
13 MR. ERBS: It's small.
14 MR. COOKE: Real small?
15 MR. ERBS: It's small.
16 MR. COOKE: Okay.
17 MR. BROOKMAN: I know some, for example, fast
18 food companies have kind of a regular change-out sort
19 of --
20 MR. ERBS: But most of the big chains Matt
21 described will negotiate pricing but there is a
22 consolidator that basically is doing the installation
23 of various pieces of equipment and that's the
24 individual who actually receives the equipment. So it
25 doesn't go directly to the chain customer. It stops

1 along the way.
2 MR. BROOKMAN: Yes, right. Okay.
3 MR. ERBS: That percentages, yes, we can, I
4 guess, take a look at that, adjust it a little.
5 MR. BROOKMAN: Great. So are there comments
6 at this point on what you see in this pie chart of
7 percentages?
8 (No response.)
9 MR. BROOKMAN: No comments at this time.
10 MR. COOKE: Moving on, to do the markup, of
11 course, we need data. The data sources that we rely on
12 right now are balance sheet information from an
13 organization called HARDI, which is the Heating, Air
14 Conditioning, and Refrigeration Distributors
15 International, and they survey their members who are
16 wholesalers and provide a pretty detailed breakout of
17 their cost structure and they do this survey every
18 year. So we use the most current survey.
19 We also have Census Bureau data for
20 mechanical contractors and I'll come back to that in
21 just a minute.
22 To do this, we break everything down in cost
23 related to the cost of the goods sold. So if you have
24 labor costs of X dollars, we'll divide that by the cost
25 of the actual equipment itself and that will become a

1 percentage markup that will be applied to the equipment
2 cost. So we do that for all the major cost categories.
3 We assume that a number of these cost
4 categories do not vary with the efficiency of the
5 equipment which would basically be related to the price
6 of the equipment. Some things, like the labor, it's
7 going to be the same. So those costs are all added on
8 to the base unit, that Level 1 unit or Efficiency Level
9 1 unit that was referred to earlier.
10 Some of the other cost components vary more
11 with the value of the equipment, such as the profit and
12 the insurance rates. So these other expenses are added
13 on as incremental expenses when we start increasing the
14 efficiency level. So those get added on to the
15 incremental efficiency costs.
16 That's kind of the basic approach that we
17 have used for most of these rulemakings of this nature.
18 Now I want to come back to the contractor,
19 mechanical contractor profit data. We're using the
20 HARDI data for that first leg. If I back up a couple
21 of slides here, HARDI basically represents the
22 wholesaler cost channel. The dealer cost channel is
23 basically the wholesaler plus an additional markup for
24 a second leg or for a second step in this distribution
25 channel. So we're using right now mechanical

1 contractor cost data for that second step and that's
2 going to get me to a question in just a minute here.
3 These are the results that you get using the
4 data that we have available to us. At this step we
5 also add on sales tax. Given the fact that the Census
6 Bureau data is available to us on a state-by-state
7 basis, we can actually vary this by state. So what
8 we're looking at here is at the national average.
9 So I want to ask a question here basically
10 about the data sources and also open it up, as well, to
11 talk about the methodology, if anyone has comments
12 about the methodology.
13 A particular question that I have that I
14 would like to address is just simply that at the
15 framework meeting, we heard that mechanical contractors
16 are typically not involved in the distribution chain,
17 but right now that's the best data that we have to
18 characterize that second step and so what I'd like to
19 do is ask if anyone has any ideas about additional data
20 sources where we could find better information to
21 characterize that local dealer segment of this market,
22 and throw it open for just general questions on these
23 last two slides.
24 MR. BROOKMAN: Daryl.
25 MR. ERBS: So your comment about mechanical

1 contractors, I guess probably not the traditional ones.
2 I mean, there are special food service equipment
3 dealers and, depending on the company, they may have,
4 as part of their company, a servicing and installing
5 company that may get contracted separately.
6 Some of our dealers are servicing companies
7 that also sell because they tend to have a good lead on
8 a lot of the replacement equipment. They go out to fix
9 a machine, and it's failed, and in some cases they get
10 the sale of that. So maybe that's a little different
11 from the model.
12 I don't really know how you can access kind
13 of industry standard data on there. I don't know that
14 much about it, to be perfectly honest. They don't --
15 you know, when we go through two-step, we're somewhat
16 isolated from some of those people in terms of just
17 what their cost structure is, even if we were going to
18 be willing to share it. I'm not sure.
19 So that's maybe a little bit of a challenge
20 for you. I don't know if you've tried to talk to NAFEM
21 or any other industry associations that might have some
22 information at an aggregate level, but that would be a
23 suggestion that you contact them.
24 MR. BROOKMAN: They are? NAFEM stands for?
25 MR. ERBS: National Association of Food

1 Equipment Manufacturers. So they may have some.
2 But then I have another comment for you that
3 isn't directly related to this question but it's back
4 on Slide 48. I'm not sure I understand this concept
5 that we would be willing to accept a lower margin on
6 the incremental costs for the additional -- if I
7 understand this correctly, it says I'm going to make
8 less margin on the additional cost I put into my
9 product to raise efficiency level than I make on the
10 base product today, is that correct?
11 MR. COOKE: It's correct, at least in part.
12 We've already covered most of the margin that the
13 wholesaler or the dealer needs to cover with that
14 baseline. So this is just a little bit of an
15 incremental price --
16 MR. ERBS: If we raise our cost for the
17 product, we're only going to do that if we feel it's
18 adding value in the marketplace and so the market price
19 is going to go up and, you know, we, like most public
20 companies, get measured pretty carefully on how we do
21 in terms of overall profitability.
22 If we add cost to our product, we expect to
23 make the same gross margin on that product with the
24 added cost as what we make today.
25 MR. COOKE: I think you actually are making

1 the same gross margin on it because you've already
2 covered most of your overhead costs on that baseline
3 and what we're really just covering is -- well,
4 literally, your margin is -- your profit actually is
5 rolled into --
6 MR. ERBS: I don't think it's that different
7 would be my question.
8 MR. BROOKMAN: You're referring to the
9 numbers here?
10 MR. ERBS: Yes.
11 MR. BROOKMAN: Yes, okay.
12 MR. ERBS: The multipliers.
13 MR. BROOKMAN: He's saying you've got a lot
14 of vetted costs. Those costs aren't going to change
15 much, right?
16 MR. ERBS: Well, if 90 percent of my cost is
17 just materials and I add more material, then the price
18 is going to go up pretty much by the multiplier for the
19 base. So, you know, I'd have to go back and look at
20 your assumptions but, you know, we're an assembly
21 house. Most of our costs are just the parts we buy,
22 the materials we buy.
23 MR. COOKE: But this is not your markup.
24 This is the distribution channel markup. Your markup
25 was that 1.2 percent, 1.25 percent that was --

1 MR. ERBS: Yes, but then you get out to the
2 other levels. They purely just take our list price. I
3 mean, because their costs are -- you know, they're just
4 going to take whatever we set as a list price and, you
5 know, discount it accordingly, but if we raise our list
6 based on our increased costs, then I think it flows
7 through.
8 To me, this understates the impact in the
9 marketplace of adding additional costs to raise the
10 efficiency level and it's not representative of what
11 will really happen.
12 MR. COOKE: Okay. Well, we'll take a note to
13 go back and think about this. Feel free to follow up
14 with some written comments.
15 DR. AMRANE: This is Karim Amrane. We have
16 made comments for years and years and it's coming back
17 the same way every time. So we gave up on making
18 comments.
19 MR. COOKE: Okay. Thank you. Moving on, the
20 Markups and then the Energy Use Analysis are two of the
21 kind of intermediate steps between the Engineering
22 Analysis and the Life-Cycle Cost and Payback Period
23 Analysis.
24 The Energy Use Analysis takes what comes in
25 the form of kilowatt hours per 100 pounds of ice or

1 gallons of water per 100 pounds of ice and translates
2 that into energy usage and water usage for purposes of
3 costing or assessing the impacts in the LCC.
4 One thing we noted here is that the DOE
5 Engineering Analysis is based on equations that are
6 based on the Test Procedure. So the numbers coming out
7 of this analysis should be relatively reflective or
8 reflect in a relatively good way what would be coming
9 out of a test procedure, as well.
10 As Mr. Eckman alluded to earlier, we're
11 assuming that the equipment runs at a 50 percent
12 capacity factor essentially. What we're given is a
13 potential output and we need to translate that into
14 output and the only way to do that is to use a factor
15 that looks at how much time it runs because it's either
16 running at a certain energy rate or it's not running,
17 it's in the standby mode and that's a different energy
18 rate, and we need to weight the two to get the annual
19 energy, and the factor that we used is 50 percent.
20 The final note on this page that I want to
21 bring your attention to is that when we did the
22 analysis for condenser water, we assumed that it was in
23 the single pass or the open loop kind of a format which
24 means it's pumped in, it's used, and it's pumped out.
25 So we have some questions about these and

1 feel free to make comments about any of these
2 assumptions, but, in particular, we have two questions,
3 one of which is about the utilization factor. Right
4 now, we're assuming that 50 percent and we do seek
5 information that could potentially be used to improve
6 upon that assumption of 50 percent, and the second one
7 is the single pass configuration.
8 At this point, we really have no information
9 to characterize this market as to how many or what
10 percentage of these units are a single pass or what
11 percentage might be on a loop.
12 MR. BROOKMAN: Okay. So comments? You can
13 see the boxes. Matt.
14 MR. ALLISON: Matt Allison with Scotsman.
15 Regarding the 50 percent utilization factor, I think on
16 the aggregate that's a pretty accurate number to use.
17 There's a pretty wide spectrum, based on seasonality,
18 as well as installation location, but, overall, I think
19 that's relatively close.
20 Relative to the single pass configuration,
21 you know, we're a step or two removed, depending on
22 which channel, from the end user. So it's hard to say
23 for sure but based on the information that we do have,
24 we believe the vast majority of machines are installed
25 in a single pass-type configuration and not on a recirc

1 loop.
2 MR. BROOKMAN: Is that determination at the
3 point of installation or is it designed in one way
4 versus another?
5 MR. ALLISON: Usually it depends on type of
6 facility it's going into. You know, if it's going into
7 like a large-scale, let's use a hotel or a casino-type
8 environment, they'll typically have cooling towers on
9 them and recirc systems that they can just tap into.
10 If it's going into a smaller location that doesn't have
11 that type of a resource, then it would be a one-pass-
12 type configuration, typically.
13 MR. COOKE: Can I ask a follow-up question?
14 We certainly could model this differently by building
15 type. So if you were to hypothesize, say, that the
16 number for hotels and hospitals is a hundred percent
17 and restaurants is zero percent or something like that,
18 we could model this separately, if you could hazard
19 guesses like that.
20 MR. ALLISON: We could take a look and
21 perhaps submit something with written comments. I
22 don't have any numbers right now.
23 MR. BROOKMAN: Thank you. Tom Eckman.
24 MR. ECKMAN: Tom Eckman. I was talking to
25 Louis. There may be some jurisdictions that don't

1 permit single pass systems because of the water usage.
2 MR. COOKE: We've heard that, I think.
3 MR. ECKMAN: So there may be a non-zero
4 number of those. I don't know what share of the
5 population of the ice maker they represent but
6 particularly in the West where water is a little more
7 precious than elsewhere, there may be some
8 jurisdictions that just will not allow that.
9 MR. COOKE: Okay.
10 MR. BROOKMAN: We have a comment from Steven
11 Schaefer on the Web and he says: We suggest to place
12 water-cooled units in closed-loop systems.
13 You can see the comment boxes. Additional
14 thoughts on both the 50 percent utilization factor and
15 single pass configuration? Daryl.
16 MR. ERBS: Yes. Just to weigh in, so I agree
17 50 percent is actually pretty close. I mean, we've
18 just done some pretty extensive monitoring on field
19 sites and we design our machines for a higher-duty
20 cycle but actually when you look across the range of
21 applications, I would agree that that's a good number
22 to use.
23 I took a note on the water cool to go back
24 and look again. The only time I'm aware that it's
25 going into a closed loop is if it's a casino or some

1 other large projects and we have visibility projects
2 because usually the engineering group will get dragged
3 into some of the special specifications but, you know,
4 all the other replacement, I suspect, is all historical
5 and it's all open loop. So we can try to come up with
6 some kind of a number.
7 MR. BROOKMAN: Okay. Good. Tom Eckman.
8 MR. ECKMAN: Yes. I would hope that we could
9 have public availability of the information on the duty
10 cycles to see whether there's a product class
11 relationship between the duty cycles and, you know, so
12 if we know in casinos or restaurants we're seeing
13 different duty cycles than hotels significantly, and
14 it's that somehow or another related to the product
15 class or at least capacities, it seems to me that that
16 may determine whether one is more cost effective to
17 pursue than another.
18 MR. BROOKMAN: Steven Schaefer has provided
19 another comment. He says: 50 percent seems low based
20 on areas. I presume he means different areas.
21 Facilities could use 90 percent usage to meet demand
22 (24-hour restaurants).
23 MR. COOKE: Okay. Moving on, Life-Cycle Cost
24 and Payback Period Analysis.
25 The purpose of this is to estimate the actual

1 impact on the customers -- which is the people who are
2 buying and using the ice-making equipment. We do this
3 by calculating key metrics -- life-cycle cost savings
4 and payback period.
5 So life-cycle cost. We look at the upfront
6 cost of the equipment and the upfront incremental cost
7 of the improved equipment and the operating cost of the
8 equipment over the lifetime of the equipment.
9 The savings would be that base case or Level
10 1 equipment minus a standard case.
11 For the payback period, we just look at the
12 incremental cost of the equipment and look at the first
13 year operating and maintenance cost savings and we
14 divide the savings into the price and that's the
15 payback -- how many years it takes to payback the
16 initial investment.
17 Life-cycle cost is a discounted value because
18 the operating costs go on over years, whereas payback
19 is just simple. It's not discounted because it's that
20 first year.
21 Here's the second seeing eye -- actually,
22 it's probably more like the third or fourth seeing eye
23 slide but if you can't read this at the back of the of
24 the room, it should be in your deck of slides.
25 This just shows where the data comes from,

1 what data is used, and where it is in the flow. So if
2 you start over in the upper left-hand corner, you see
3 the price information coming in from the Engineering
4 Analysis and below that you see the Markup information
5 and that all combines into a customer price. There's
6 actually another input that goes into here that I'm
7 going to talk about in a minute and I think when you
8 see this final slide that will be a yellow box but it's
9 called Experiential Learning.
10 We add to that an installation cost and that
11 gets you your total installed cost of the equipment.
12 On the bottom side, starting at the left, you see the
13 energy and water consumption coming in. We combine
14 that with some electricity and water prices, repair and
15 maintenance costs, and then some other things, like the
16 lifetime of the equipment, the discount rates, and
17 growth rates in electricity and water prices and that
18 gets you an annual operating cost and an operating cost
19 over the life of the equipment.
20 Any questions on this? Yes?
21 MR. STARR: In your water cost --
22 MR. BROOKMAN: Louis, say your name.
23 MR. STARR: Oh, sorry. Louis Starr with NEA.
24 In your water cost analysis, you're assuming the water
25 that's input to clean the thing as well as the

1 condenser side, is that correct?
2 MR. COOKE: That's correct.
3 MR. STARR: And does it also cause -- are you
4 looking at the sewer costs associated with water or
5 not?
6 MR. COOKE: That's correct.
7 MR. STARR: Okay. So all three of those.
8 MR. COOKE: Yes.
9 MR. STARR: Thanks.
10 MR. COOKE: And I think that's probably on
11 the next slide. Well, maybe not.
12 The next slide is experiential learning or
13 what we call price learning. The theory here is that,
14 as manufacturers make increasing amounts of their
15 equipment over time, that the price, the real price of
16 equipment tends to go down, and this is something
17 that's been observed for a number of years and
18 commented upon in the past.
19 DOE has assumed that this price would remain
20 constant but within the last year, we've started to
21 take a look at whether the real price of manufacturing
22 equipment does tend to go down over time.
23 There was a Notice of Data Availability. You
24 see that in the red comment at the bottom. This is a
25 new addition to help you find information on this, if

1 you're interested. That's where DOE first broached
2 this idea and talked about it. It's also talked about
3 or discussed in Appendix 8C of the TSD.
4 For this analysis, we looked at Producer
5 Price Indexes and historical shipments information that
6 we gleaned from a couple of different sources that Nate
7 will be talking about later on when he talks about the
8 National Impacts Analysis.
9 For the Life-Cycle Cost and Payback Period
10 Analysis, we're really only looking at one purchase of
11 equipment and that would be at the year that the
12 equipment goes into -- that the standard would go into
13 effect. So for purposes of the Life-Cycle Cost
14 Analysis, we basically had to calculate a factor to
15 take the cost of the equipment from the year in which
16 the estimated engineering costs were valid to that 2016
17 point, which is about five years.
18 So we actually decreased the costs that are
19 coming into us from the Manufacturer or from the
20 Engineering Analysis by approximately 1.7 percent.
21 So I'm going to throw this open for
22 questions. I see a few looks of puzzlement.
23 MR. BROOKMAN: Karim.
24 DR. AMRANE: I'll start, I guess. Karim
25 Amrane, AHRI.

1 I guess we disagree with this approach and we
2 filed comments when DOE issued its Notice about that
3 and we gave you reasons why at the time, but for this
4 specific product, have you done any analysis to show
5 that the price will decline, has declined over time?
6 MR. COOKE: The analysis that we did actually
7 did use real -- I mean, it's high-level data. It's
8 compiled data but if you're talking about have we gone
9 out and done surveys or something like that --
10 DR. AMRANE: Because I believe everything
11 you're basing it on is based on household refrigerators
12 or things like that. Have you looked at ice makers
13 over 30 years, 40 years, and see whether the price of
14 ice makers went down?
15 MR. COOKE: This is based on Price Index
16 information for the commercial refrigeration industry
17 as a whole which would include the ice makers and
18 probably some other HVAC type of equipment. This is at
19 a fairly high NAICS level.
20 DR. AMRANE: I think the whole basis of this
21 analysis came from household refrigerators and DOE had
22 40 years' worth of data. They looked at it and they
23 saw that over the years the price went down and that's
24 how this all started. Now you're applying this concept
25 to everything else and I guess in this particular case,

1 I don't think that you have the data to show the price
2 went down. The standard started in 2010.
3 So how can you estimate that? On what basis
4 are you doing it?
5 MR. COOKE: Well, you know, again, this is
6 based on real data. We will be looking -- at the NOPR
7 phase, we will again be revisiting this and we'll take
8 a look at what additional data might be available.
9 MR. LLENZA: This is Charles Llenza,
10 Department of Energy.
11 Can you -- the data that we have looked at,
12 how far back does it go?
13 MR. COOKE: This was estimated at least on 30
14 years' worth of data.
15 MR. LLENZA: What Karim is pointing out his
16 understanding was it was for residential refrigerators.
17 MR. COOKE: Well, this was not for
18 residential. This was done specifically for the
19 commercial refrigeration, the WICF, the ice makers.
20 This was done with data that applies to --
21 MR. LLENZA: That particular equipment?
22 MR. COOKE: -- this kind of family of
23 equipment.
24 MR. LLENZA: Okay. So what he's saying --
25 okay. Go ahead.

1 MR. CLAYVILLE: Nate Clayville, PNNL. So
2 specifically, we used data from the United States
3 Census Bureau's Current Industrial Reports going back
4 to 1975 which was ice maker-specific, as well as PPI
5 data that was specific to the commercial refrigeration
6 equipment spectrum, you know, it was an umbrella term,
7 which also went back several years. Off the top of my
8 head, I don't remember exactly how many years, but we
9 did go ice maker-specific. This has been done but not
10 necessarily presented yet but done for several products
11 and we're able to kind of differentiate between the
12 products. We can actually quantify it and see
13 differences in ice makers specifically.
14 DR. AMRANE: But was the data based on energy
15 efficiency or what kind of data did you get?
16 MR. CLAYVILLE: The data was based on market
17 trends. It was based on shipments as well as actual
18 inflationary values that we were able to glean from the
19 Producer Price Index.
20 MR. BROOKMAN: And so you were able to
21 document the prices actually declined by this amount?
22 MR. CLAYVILLE: Yes. Yes.
23 MR. BROOKMAN: Okay. Thank you. Matt.
24 MR. ALLISON: Just a comment. I'd like to be
25 able to see that data, if you could share with us.

1 MR. BROOKMAN: NAICS, N-A-I-C-S, data. Is
2 that what you said? So that category is that?
3 MR. COOKE: What does NAICS stand for, Nate?
4 National --
5 MR. CLAYVILLE: North American Ice -
6 MR. BARRINGTON: The North American Industry
7 Classification System.
8 MR. COOKE: Okay. Thank you. It's the
9 replacement for what we used to call Standard
10 Industrial Codes, SIC Codes.
11 MR. LLENZA: This is Charles again from the
12 department.
13 We will provide more details on the listing
14 of the data we used for this.
15 MR. BROOKMAN: Matt.
16 MR. LLENZA: And then you
17 can make comments.
18 MR. ALLISON: Okay. And again, I guess I
19 would say here, it kind of depends on what technologies
20 you're looking at, if I understand what you're doing
21 here correctly, but if you start talking about a
22 condenser, for instance, and increasing the size of it,
23 you know, that price is going to be driven much more by
24 commodities of copper and aluminum by any experiential
25 learning. It's going to be zero experiential learning

1 with a condenser that gets two inches wider over the
2 course of time.
3 MR. COOKE: But I think that's actually
4 something that would be captured within this because
5 the experiential learning really is just looking at the
6 aggregate prices over time and the change could be from
7 any number of different things. It could be because
8 you figured out better ways to do things on your
9 manufacturing floor or found better ways or better
10 sources of inputs. So all that might very well factor
11 into it.
12 MR. LLENZA: From my knowledge of this, the
13 way they're doing this, is data actually would be
14 captured here because it would be prices of copper,
15 improvements in innovation in that particular
16 technology trend that are reflected in the market, data
17 that they captured, and they used it for residential
18 refrigerators, as referred to, but, you know, the
19 Office of Management and Budget now asked us to do this
20 for not only, I believe not only for residential
21 refrigerators but for all appliances now. So it's just
22 one of those --, I don't think we have much to say,
23 other than the fact that this is an offset of
24 additional analysis now.
25 MR. ALLISON: I think just to be able to give

1 some meaningful comment, I'd like to see it and get to
2 understand a little bit more about the background of it
3 compared to our experiences.
4 MR. CLAYVILLE: This is Nate Clayville again,
5 PNNL.
6 Just speaking to the data that you're
7 interested in seeing, in Appendix 8C of the Technical
8 Support Document, we documented this pretty well.
9 Almost, if not all, of the data that you would like to
10 see is in there as well as all the equations and
11 everything that went into actually documenting and in
12 coming up with these values.
13 MR. BROOKMAN: Thank you.
14 MR. COOKE: I'd like to add one other comment
15 with respect to Karim's comment and that is just that
16 we're not really -- we're changing the price of all of
17 the equipment. It's not just the incremental costs.
18 So this isn't really efficiency-related. We're not
19 changing just the incremental efficiency costs. We're
20 changing the base equipment costs, as well. So it's
21 all trending down.
22 MR. BROOKMAN: Okay. Thank you. We have
23 received a question from Scott Deschettler. He asks:
24 What is used as the discount rate on Slide 53? You're
25 going to be covering discount rates further on, right?

1 MR. COOKE: I'm about to turn to that in
2 about a minute.
3 MR. BROOKMAN: In two or three more slides,
4 right. Daryl.
5 MR. ERBS: I guess my comment or question
6 relates to I think you said you went back how many
7 years? 30 years?
8 MR. COOKE: We have data that actually starts
9 in '48 but I think the data that was done, used for
10 this went back to about 1970-1975.
11 MR. ERBS: So my question is how do you know
12 the next five years will follow the same trend of the
13 last 30? You know, when I think about the ice machine
14 industry specifically, there was a period of pretty
15 good year over year growth in terms of volume that I
16 think had to do with fast food rolling out across the
17 nation and there are a bunch of factors -- hotels, lots
18 of building.
19 If you look at the last three or four years,
20 and Karim probably, you know, would be a good source of
21 some recent trends, our volumes aren't growing and, you
22 know, there's been some kind of dips in the road due to
23 economic meltdowns and things, but if you look at more
24 of a weighted kind of trend over the last, I don't
25 know, five years or whatever, we're kind of flat.

1 We're not really growing in terms of volume.
2 We all like to hope that, you know, suddenly
3 people are going to start buying lots and lots of more
4 ice machines but when you look at the demographics and
5 the replacement market driving it and everything else,
6 we're not seeing huge volume increases. So that's not
7 driving efficiency for us. We're working on better
8 ways to build products that helps us offset some of the
9 other things that have come to roost on our nest, you
10 know, in terms of environmental regulations and all
11 sorts of other things.
12 So, I mean, two percent's not a lot but again
13 I just would caution using a trendline that's based on
14 too far back in history to predict the future.
15 MR. BROOKMAN: Nate, you want to comment?
16 MR. CLAYVILLE: Yes. I'd just comment on
17 that. So although we go back to 1975 using the CIRs or
18 the Current Industrial Reports, that really is just the
19 basis for building up shipments and to be able to
20 essentially forecast shipments.
21 In terms of having some idea about what it's
22 going to be in the next five years, we don't, of
23 course. All we have is available data to use to try to
24 forecast and get a good idea about what it might look
25 like over the next five years.

1 Does that answer your question? I feel like
2 I missed an aspect of that. I'm sorry.
3 MR. ERBS: It does. I mean, I look at it
4 from what goes on in our factory perspective and none
5 of our processes have changed radically in the last
6 five years and they're not going to in the next five
7 years, right. The way we assemble things, the sheet
8 metal we make because of our volume is going to run on
9 turret presses in five years, just like it does today.
10 So, you know, I think about, well, where are
11 those efficiencies coming from for us, I struggle a
12 little bit.
13 MR. CLAYVILLE: And you're correct. The
14 assumption here is that efficiencies are built up not
15 from economies of scale. It's not that you're making a
16 lot of them and so the price is diminished because of
17 that but it's because there are just efficiencies that
18 naturally occur in making ice makers over time and, as
19 you're saying here, and it's important for us to note,
20 that you don't feel that there's much room for the
21 small efficiencies, correct?
22 MR. ERBS: Well, again, like I say, I think
23 what we hope to do is by improving worker productivity
24 a little bit, we offset the increasing healthcare costs
25 for them, you know, some of the other factors that

1 would otherwise cause it to be more expensive to build
2 the same machine in the future, but I just don't see us
3 making huge gains. Again, I don't know if it's worth
4 arguing over.
5 If it's just two percent, I thought I saw in
6 one of the appendices where it projected out over 20
7 years a 20 percent decrease in cost and that kind of
8 really took my breath away when I saw that.
9 DR. AMRANE: This is Karim with AHRI. Can
10 you talk about this a little bit because I think that
11 you are going much further than just two years or three
12 years.
13 MR. COOKE: Yes. This is just for the LCC
14 and Payback Period. So, yes, you are right.
15 DR. AMRANE: So the assumption is that you
16 are 20 years from now, the price of the ice maker will
17 cost 20 percent less or I don't know how much it is,
18 based on the curve, right?
19 MR. COOKE: That's correct. And that would
20 be -- and that does appear in the National Impacts
21 Analysis, and I don't know if it's 20 percent in the
22 base case, but when you get into the National Impact
23 Analysis where you're purchasing equipment 30 years in
24 the future, this is rolling out 30 years into the
25 future, correct.

1 MR. BROOKMAN: Charles Llenza.
2 MR. LLENZA: Charles Llenza, Department of
3 Energy.
4 Part of the problem is that it's based on
5 statistics. So when the statisticians looked at this
6 and they compared the actual trending with the price,
7 they found that the trend actually was reflected in the
8 pricing and they did the curve fits to see if they had
9 a fit accordingly. I understand what you're saying,
10 it's hard to believe that you're going to see a
11 decrease in the equipment over years of 20 percent when
12 nothing's changed, right, and your pricing and your
13 costs are going up.
14 But basically it's statistically based and
15 they've done it for residential refrigerators and
16 they're doing it now with all these products.
17 MR. BROOKMAN: Karim.
18 DR. AMRANE: Karim Amrane with AHRI. If I
19 may say, again maybe there wasn't enough good data for
20 household refrigerators. I don't think that you had
21 this data for ice makers.
22 For me, this is the way for DOE to justify
23 anything that DOE wants to justify as far as minimum
24 energy efficiency standard. If you use this analysis,
25 you can justify max tech which, by the way, you know,

1 that's what your analysis is showing. I don't think
2 it's right. I think it's totally flawed and in this
3 particular case, I don't think you have the data to
4 prove it.
5 MR. COOKE: Okay. Thank you.
6 MR. BROOKMAN: Yes, Matt.
7 MR. ALLISON: Yes. I can just relate what
8 our experience is and I don't know what it was, you
9 know, 30 years ago, but I can tell you now just from
10 year to year, just trying to maintain flat costs from
11 one year to the next is a struggle, and typically we do
12 see some sort of increase that we try to recapture at
13 least some of it in the form of price increases and
14 usually we can't even recapture all of it in doing
15 that.
16 So it is a struggle and I'm not sure how the
17 statistics feed into this or the past models but the
18 reality of how things seem to operate today just, I
19 don't know, there seems to be a disconnect somewhere
20 and to expect that these prices are going to go down
21 over the years, it just doesn't make a lot of sense.
22 I know if you look at some of the other
23 industries, such as household refrigerators or whatnot,
24 you know, a lot of that price decrease that they've
25 seen over the years, they've offshored manufacturing a

1 lot of that stuff, and, frankly, we just don't have the
2 scale to be able to even consider doing something like
3 that.
4 So, you know, certainly you can plug that
5 kind of stuff in and it might force some unintended
6 consequences, such as that, but I think we need to be
7 careful about this.
8 MR. BROOKMAN: Okay. Thank you. Final
9 comments on this? We're going to keep moving on.
10 MR. COOKE: And, of course, written comments
11 are appreciated.
12 I wanted to make one quick comment here about
13 the efficiency level that we're using for the base.
14 You heard earlier the Engineering Analysis where the
15 base for batch is basically the cube standards that has
16 been extended to reach to the full 4,000 pound per day.
17 For continuous, we have a different approach
18 where we're calculating a base or an Efficiency Level 1
19 that basically captures all of the equipment that's
20 available in the market or that's potentially available
21 in the market, and one of the things that we found
22 doing both the National Impacts Analysis which Nate
23 will be talking about in a little while and also in the
24 LCC is that if you look at the distribution of
25 equipment that's actually on the market that somebody

1 could purchase today, some of the really low efficiency
2 bins in the continuous class, especially, appear to
3 have no shipments and so I want to fill this out as a
4 question and I don't know if you have the ability to
5 answer this today. If not, in writing would be great.
6 We do seek comments on the methodology that's
7 basically used to determine what the baseline
8 efficiency level is for purposes of the LCC and Payback
9 Period Analysis. If the Engineering Analysis needs to
10 start at a lower level and build up, they can, but we
11 could also choose a different efficiency level for the
12 LCC and Payback Period, if we wanted to.
13 So I would ask you, as you look at the data
14 and as you look at what you know the market to be, if
15 you could comment on that.
16 MR. BROOKMAN: Tom Eckman.
17 MR. ECKMAN: Alan, do you have shipments by
18 efficiency level?
19 MR. COOKE: We have a very good shipments
20 database from AHRI and we also have availability of the
21 AHRI testing data that's posted on their website which
22 is not shipments, it's just what models are available,
23 and we've tried to combine those two to get at what the
24 actual shipments by efficiency level could be because I
25 don't think we actually have a shipments by efficiency

1 level per se.
2 MR. ECKMAN: Shipments by product
3 availability?
4 MR. COOKE: And by size of the product.
5 MR. ECKMAN: By size, yes, but not knowing
6 what the shipments of that product are, just that it's
7 available, is that right? That's what I'm trying to
8 understand. What is available?
9 MR. BROOKMAN: Karim.
10 DR. AMRANE: What's available in the website
11 is just, you know, product classes and with their
12 specific efficiencies model by model. It's not
13 shipments, but I believe that we shared the information
14 with you. Maybe I'm wrong but I think we did share
15 some shipment-weighted efficiency numbers with you.
16 MR. COOKE: And we did try to fit -- use the
17 shipments data that you gave us, the weighted
18 efficiencies, and also the availability of equipment
19 per what shows up in that database, and come up with
20 these bins. That's why I couched my question with I'm
21 not sure if you can actually address this question here
22 now off the top of your head, but as you look at that,
23 if you could give some thought to the baselining of
24 some of these commercial product classes, it would be
25 great.

1 Electricity and water prices. Some of this
2 is pretty standard. The red, by the way, is basically
3 spelling out some abbreviations that not everyone might
4 have been familiar with. We use EIA, Energy
5 Information Agency, Form 861 data to get us baseline
6 electricity prices specific to, it should say major
7 classes, like commercial versus industrial, and
8 specific to state. We're using growth rates that are
9 based on the Annual Energy Outlook from 2011. Again,
10 that's specific to sector. It's specific to region and
11 we kind of spread it around to the states so that we
12 can put together a state-by-state database.
13 Both of these will be updated. I should note
14 that everything on this slide will be updated if it's
15 possible to update it.
16 We extend the commercial sector pricing to
17 actual individual building types, like hotels or
18 hospitals, using data from the Commercial Building
19 Energy Consumption Survey. We came up with a base year
20 water cost using an American Waterworks Rate Survey and
21 we did use the water and wastewater, so water cost is a
22 combination of those two.
23 This was put together by state using the
24 observations that we could pull out of the AWWA, out of
25 their last two surveys, and the prices were chosen for

1 a size of service that would be more or less a
2 commercial size of service.
3 We based the growth in water prices on
4 Consumer Price Index for water costs or utility costs.
5 I think I don't have a slide particularly
6 asking questions for that.
7 Are there any comments on any of this before
8 we move on?
9 MR. ECKMAN: This is Tom Eckman. Have you
10 compared the CPI with the Wastewater Water Escalation
11 Rate increases over the last decade or something like
12 that?
13 MR. COOKE: Where would I find --
14 MR. ECKMAN: My impression is that if you
15 looked at the prior AWWA surveys over a time series,
16 you might get a different rate of growth.
17 MR. BROOKMAN: You think the CPI wouldn't
18 reflect that?
19 MR. ECKMAN: Right. I think there might be
20 -- I think they're systematically higher than the CPI
21 has been, but I can't say that for sure.
22 MR. COOKE: They are. I think you're
23 absolutely right. We did look at that and part of why
24 we came to this is that there's actually federal
25 guidance if you're going to be doing analyses of this

1 type and you don't have a good forecast, that the CPI
2 is, shall we say, a default value that you can rely on.
3 We did look at a couple of historical surveys
4 and they are growing at a fast rate and I think if you
5 extrapolated that out 30 years, you would quickly find
6 that ice makers are spending a large amount of money on
7 water and this is one of those cases --
8 MR. ECKMAN: And that might not be.
9 MR. COOKE: That's right. And this is one of
10 those cases where we seriously question whether recent
11 history is indeed reflective of the future, at least
12 the long-term future, and we went with the default
13 which is specified in that.
14 MR. ECKMAN: Tom Eckman. With Clean Water
15 Act provisions coming out from EPA and the requirement
16 to do whatever it is, American Drinking Water Act of
17 whatever the year was, I mean, I don't anticipate that
18 those escalation rates will diminish much but they will
19 probably level out once that Act's requirements are
20 satisfied.
21 So I guess the question is whether or not we
22 would use that escalation rate for the full 20 or 30 or
23 40 year period you're doing the analysis or at least in
24 the near term the CPI is an underestimate but may be
25 okay in the long run. I mean, it may be that you have

1 -- that the short run analysis needs to -- at least
2 till the time the standard goes into effect may be
3 representative of what you see past recent trends in
4 prices being and then longer term you might move to the
5 CPI but, you know, we're not done with the regulatory
6 impact of the Clean Water Act yet.
7 MR. COOKE: Okay. Noted. Yes.
8 MR. STARR: Louis Starr with NEEA. Along the
9 same kind of line of questioning on electricity and
10 then also whether that includes demand charges and
11 electricity costs and also some other things on the
12 discount factors and escalation rates, too, would be
13 nice.
14 MR. COOKE: Okay. Discount, we'll get to in
15 just a minute. The Annual Energy -- Energy Information
16 Agency's data does include total electricity costs. So
17 that would include demand and energy costs. It's all
18 rolled into one per kilowatt hour charge. I think that
19 was the only question you asked on material we've
20 covered.
21 MR. STARR: Yes.
22 MR. BROOKMAN: Other comments on electricity
23 and water prices?
24 (No response.)
25 MR. BROOKMAN: Okay.

1 MR. COOKE: Installation costs, repair costs,
2 and maintenance costs. In the Preliminary Analysis,
3 we've estimated all three of these using basically a
4 fixed percentage.
5 In the first case, it was a fixed percentage
6 of the manufacturer's selling price and I think that
7 percentage was actually 10 percent. It varies by state
8 and it varies by the type of equipment, so you can see
9 the averages for remote condensing, self-contained, and
10 ice-making heads.
11 For both annual repair costs and annual
12 maintenance costs, that percentage was three percent of
13 the base which is the Level 1 customer equipment costs
14 and again you can see the resulting numbers by the
15 types of equipment. Those were varied by equipment
16 class and again they don't increase with efficiency
17 levels.
18 So we have a page full of questions that will
19 follow and I might just let Doug read these questions
20 or lead the charge on these questions.
21 MR. BROOKMAN: I will just post the chart up
22 there, that is, the question box, Item 16, and you can
23 see they relate to what DOE has uncovered or described
24 here with respect to installation costs, maintenance
25 costs, repair costs, and generally the technology

1 options under consideration. You see that final
2 question at the bottom of the box.
3 We're getting down to some specifics here.
4 So comments would be very helpful, whether now or in
5 considerable detail in your written comments.
6 Daryl.
7 MR. ERBS: So I think, in general, I would
8 agree that there shouldn't be any large impact on
9 installation, maintenance. Repair costs, it depends on
10 the components. So, for example, if we go to ECM
11 motor, fan motors, they will fail at a certain rate.
12 In fact, my concern would be they're probably less
13 reliable than a standard PSC motor just because they're
14 more complex devices and, you know, generally the more
15 parts you have in a device the more it fails.
16 So we'd have a higher first cost motor that
17 would fail more often and that would impact us really
18 at a warranty cost level. So, you know, that's one
19 example.
20 I think other than that --
21 MR. BROOKMAN: Fail within the warranty
22 period?
23 MR. ERBS: Some percentage will. I mean, you
24 know, we try to manage all of our -- well, one thing
25 you have to understand, we give a three-year warranty,

1 so it's a fairly long warranty, and it's not a high
2 percentage. So that would be a small impact but it
3 would be there.
4 I think in terms of installation costs, the
5 only thing I could think of is if the remote condenser
6 is twice as big, then that cost will go up, you know.
7 If it's a small change in its size, it's probably not a
8 big deal but, you know, a lot of the remote condensers
9 actually require a crane rental to install it and so if
10 it gets bigger, it'll cost more. If it's small, you
11 know, small effects. So, overall, I think it's a
12 pretty good assumption.
13 MR. BROOKMAN: Other thoughts on installation
14 costs, maintenance costs, repair costs, and the general
15 question you see there?
16 (No response.)
17 MR. BROOKMAN: I think in a little bit we're
18 going to break for lunch.
19 MR. COOKE: We're almost done with this
20 section.
21 MR. BROOKMAN: I know. With this segment,
22 yes. I think we're --
23 MR. COOKE: Discount rates are easy.
24 MR. BROOKMAN: Okay.
25 MR. COOKE: Discount rates. Speak of the

1 devil.

2 To start with, we're looking at running these
3 analyses by the type of establishments. So we're
4 looking at lodging, healthcare, food sales, food
5 service, retail, education, and office. To develop
6 discount rates, we actually go into publicly-available
7 financial information and using some fairly well-
8 established formulas that are documented in Chapter 8,
9 we estimate a cost of debt and a cost of equity for
10 each of the firms in this database and there's like 2
11 or 3,000 firms in our total database that we're using
12 for these building types.

13 So we estimate the cost of debt, cost of
14 equity, come up with a weighted average of the two, and
15 for some of the analyses we use an average that has
16 been averaged across, say, the building type, lodging.
17 For most of them -- I'm going to talk in a moment about
18 Monte Carlo Analysis -- we just sample. So we use a
19 discount rate that's based on company X or company Y or
20 company Z.

21 And in some of the building types, we might
22 add a little adder because we know that a certain
23 percentage of the building types are municipal
24 government buildings or something else. So there might
25 be a weighted average where we look at part of this and

1 part of, you know, what comes out of this WAC formula
2 and part weighting on municipal bond rates, something
3 like that.
4 The equipment lifetime is eight and a half
5 years. We use that for all equipment types and I'm
6 going to talk again in a minute about Monte Carlo. We
7 actually really didn't model anything at 8.5 years. We
8 pulled a year out of a hat based on a distribution that
9 comes out of some of the analysis done for the NIA
10 analysis where some of the equipment starts failing at
11 four years, some of it lasts as long as 12 years, and
12 the average is about eight and a half when you weight
13 this up.
14 So we do an uncertainty analysis where we
15 allow almost all these variables to vary. A lot of it
16 depends on what state you're located in, so the
17 installation costs we can vary using some RS means
18 data. Markups we can also vary using some of the
19 things in the Census Bureau and the sales tax.
20 Electricity prices vary by state.
21 So we just pick a state based on a population
22 weighting. Building types vary and that takes you to a
23 different discount rate and a different electricity
24 cost. The lifetime of the equipment is varied and we
25 also vary the efficiency level that we're starting from

1 when we do this analysis. We don't start every one of
2 them from Efficiency Level 1. We start it from a
3 weighted average or from a distribution that's based on
4 what we pulled out of that shipment and sales data that
5 we just talked about a minute ago.
6 I'm going to stop right there. That was a
7 lot. Comments? Feedback on any of this, these last
8 two slides?
9 (No response.)
10 MR. COOKE: They must want to have lunch.
11 MR. BROOKMAN: I think we're getting close to
12 lunch. In fact, maybe we should just pause now. It's
13 12:30.
14 MR. COOKE: This is the last slide.
15 MR. BROOKMAN: I know. I know there's one
16 more. We'll get through this. Okay. Go ahead.
17 MR. COOKE: So I just want to let you know
18 that when you add all of this up, you have the Life-
19 Cycle Cost and the Payback Analysis. Each one of the
20 equipment types that we look at has a table like this,
21 so you should know how to read this table.
22 The third, fourth, and fifth columns look at
23 the Life-Cycle Cost, assuming that you're starting at
24 an Efficiency Level 1 and just building up through the
25 efficiency levels. So you have the installed costs,

1 the total discounted operating costs, and the life-
2 cycle costs.
3 This middle set of columns here where it says
4 Life-Cycle Cost Savings across the top, we're actually
5 looking at who is affected by the standard, and by
6 that, I just mean simply if you are currently already
7 buying Level 3 equipment and we set a standard that
8 makes Level 1 equipment illegal, you're not affected
9 because you're already buying something higher than
10 that level.
11 So you see in the middle column there where
12 it says No Impact, at Level 2, 41 percent of the
13 customers had no impact. That means that, according to
14 the data we found, 41 percent of the customers were
15 actually already buying Level 3 or Level 4, i.e.,
16 EnergyStar equipment, and in this particular case,
17 almost everybody had a net benefit. At Level 4, we see
18 92 percent net benefit which means that this is highly
19 cost effective. Indeed, at Level 4, we saw a 0.9 year
20 payback period. Of course, this gets back to some of
21 what Daryl was talking about earlier with the costs but
22 this is what will be looked at during the NOPR phase.
23 MR. ERBS: Just a question where the decimal
24 point is on there.
25 MR. BROOKMAN: Daryl, you want to say that

1 for the record?
2 MR. LLENZA: This is Charles again from the
3 department.
4 One of the things, this is why it's important
5 that we get the numbers right. What we're trying to
6 outline, also, is methodology. So we probably don't
7 have the right numbers in the right boxes. So once we
8 get the right numbers in the right boxes, this should
9 at least provide better information and an actual more
10 useful payback period and everything else, so.
11 MR. BROOKMAN: So there's a lot of information
12 here and Alan has in the preceding slides described
13 generally the methodology and, boy, the department
14 would really benefit from your detailed comments on
15 this stuff. This is important.
16 So I'm going to suggest we take lunch right
17 now. It's 12:30. We'll go for an hour. Please don't
18 leave the Forrestal Building. You won't get back in
19 time. We're going to break for an hour. We'll resume
20 at 1:30. We're through the bulk of it, so that's good.
21 The comments have been excellent, very, very helpful.
22 You must wear your badge in the building.
23 You know where the restrooms are. There's a big
24 cafeteria if you go down to the ground floor and go
25 about a hundred yards that way and then up the

1 escalators and there's also a Subway shop, a little
2 sandwich shop, right where the coffee shop is, also on
3 the ground floor. You turn left from the elevator
4 bank.
5 So this room will be locked. You can leave
6 your stuff here, and I'll just thank you. We had a
7 really good amount of information this morning. We'll
8 resume at 1:30. See you back here then.
9 (Whereupon, at 12:30 p.m., the meeting was
10 recessed for lunch, to reconvene this same day at 1:30
11 p.m.)
12
13
14
15
16
17
18
19
20
21
22
23
24
25

1
2
3 A F T E R N O O N S E S S I O N
4 (1:30 p.m.)
5 MR. BROOKMAN: Welcome back. We are going to
6 pick up where we left off and we're going to hear from
7 Nathaniel, Nate, Clayville.
8 Shipments Analysis and National Impact Analysis
9 MR. CLAYVILLE: Perfect. Thank you. Again,
10 my name's Nathaniel Clayville. I'm with Pacific
11 Northwest National Laboratory, and I'm going to be
12 tackling the Shipments Analysis and National Impacts
13 Analysis, some of the methodology that we used in it
14 and some of the results that we were able to derive
15 from it.
16 For your reference, in the Technical Support
17 Document, the Shipments Analysis, Chapter 9, and the
18 National Impacts Analysis is Chapter 10, and there are
19 two Supplementary Appendices which are Chapter 10, the
20 National Impact Analysis. One of them is the
21 Instructions and another one gives some of the really
22 granular nice output tables.
23 Let's go ahead and jump right in talking
24 about the Shipments Analysis.
25 This is an important analysis for some of the

1 downstream analyses that we do, namely, the National
2 Impacts. One of the reasons it's important is that it
3 has a lot of ability to shape what the NIA looks like.
4 Now the purpose of the Shipments Analysis is
5 to actually estimate some of the future stock and
6 shipments of the ACIM equipment. We do this by
7 equipment class and we also do it by efficiency level.
8 Now to calculate and to estimate this future
9 stock, the first thing that we actually need is
10 historical shipments data. To do this, we're very
11 lucky in this rulemaking that we were able to obtain
12 shipments data from the year 2010 submitted by AHRI.
13 The data was able to give us a very easy breakdown of
14 shipments for the year 2010 that we were able to easily
15 convert into the equipment class market shares.
16 Once we had that data, we actually paired it
17 with a couple of other pieces of data. For instance,
18 we used the United States Census Bureau's Current
19 Industrial Reports which I spoke of earlier which gave
20 us a great set of historical data, as well as North
21 American Association of Food Manufacturers 2010 Report
22 which gave us data that allowed us to split the
23 shipments into domestic and international shipments, so
24 we can focus more on the domestic side, and all
25 equipment stock was estimated and started off based on

1 2010 shipments data.
2 To grow it in the future, we used future
3 shipments, a proxy that we were able to base off of the
4 historical growth rates that we derived from the
5 commercial floor space construction forecast from the
6 EIA's Annual Energy Outlook 2011.
7 Any questions on any of the sources so far?
8 (No response.)
9 MR. CLAYVILLE: This is a -- on the next
10 slide here, this is just a breakdown and a good visual
11 of the equipment class market share. Again, this is
12 based off of 2010 AHRI shipments data. It was the most
13 recent and complete shipments dataset that we were able
14 to obtain and it gave us very detailed data here.
15 One thing that's important to note on this
16 dataset is fourth from the bottom on the right-hand
17 column there you'll see that it's the self-contained
18 unit water-cooled small continuous unit. We actually
19 have a zero percent market share for that. We were
20 unable to identify any shipments in that product class.
21 We kept it there because we feel that it's still a
22 viable equipment class and we think that there may
23 still be some shipments that may be able to be
24 identified in the NOPR stage and in case there are,
25 it's easier to leave something in and take it out later

1 than it is to add it back in. So we left it there but
2 it might look a little funny later on.
3 Some of the output tables, you'll see just a
4 big blank across the screen for it and it's because
5 there were no shipments that were identified in there.
6 Are there any questions or any comments on
7 the way that we derived this or about any of these
8 actual figures?
9 MR. BROOKMAN: Tom Eckman.
10 MR. ECKMAN: Tom Eckman. So this
11 distribution is from the 2010 sales. So is 2010
12 typical or is it atypical of history?
13 MR. ERBS: It's better than 2009.
14 MR. CLAYVILLE: Again, 2010 -- at the time of
15 the analysis, 2010 was the most --
16 MR. BROOKMAN: This is on the record. Go
17 ahead.
18 MR. ERBS: Daryl Erbs, Manitowoc. In terms
19 of 2010, I would say it was still a little below
20 historical levels but, you know, it was recovered from
21 2009. The mix, I would say, is probably -- yes, it's
22 -- you know, there's shifts over time between batch and
23 continuous type that I think are, you know, continuing
24 but I would say this is a pretty good snapshot.
25 MR. ECKMAN: I'm assuming that 2010, this is

1 Tom Eckman, was more dominated by replacement market
2 than, say, 2007 or 8, for example. So is the mix in
3 the replacement market much different than it is when
4 there's a new construction market?
5 MR. CLAYVILLE: Yes. Let me go ahead and
6 move into the next slide to kind of show you the
7 representation of that.
8 So this is what we were able to derive using
9 the floor space forecast from the AEO 2011 data, along
10 with the 2010 shipments data. We were able to grow
11 things out and one real big benefit that we were able
12 to derive by also using the CIR, the Current Industrial
13 Reports, was that we were able to break it out into new
14 and replacement items where the new items across the
15 bottom of this graph here are the dark green portions
16 and the replacement items are the top portions right
17 there.
18 We definitely were able to quantify this and
19 this is laid out in great detail in the TSD as well as
20 just in the Executive Summary which you have in front
21 of you. So you can actually get a little more granular
22 with it but now this doesn't go back to 2010 obviously.
23 We picked select years to kind of represent what the
24 output would be or what our analysis shows the forecast
25 for data, but we do have the data. I believe it's in

1 the Executive Summary that does summarize some of the
2 2010 shipments and the proportions there.
3 MR. ECKMAN: This is Tom Eckman. So the
4 class mix is the same, different?
5 MR. CLAYVILLE: No. This is based on the
6 exact same -- this is based on this market --
7 MR. ECKMAN: Going forward?
8 MR. CLAYVILLE: -- share. Correct. Yes,
9 going forward. We didn't really have any data to
10 support the theory that the classes are going to change
11 over time and we would appreciate any data, if any
12 exists out there, to help us be able to incorporate
13 that into our analysis.
14 But because this is data we have, we actually
15 moved this forward and kept it constant over time, and
16 when it was constant over time, we were able to grow it
17 along with the appropriate growth rates. This is --
18 and again, this is just kind of showing select years
19 that we picked out but it gives a good representation
20 of what kind of trend we're looking at over the
21 analysis period.
22 Now we did pick select years and you can see
23 the values there, but a good number to note is that the
24 total cumulative shipments were 8.8 million over the
25 entire analysis period and to contrast that, the total

1 stock that we forecast in 2006 was estimated at 1.75
2 million. So that gives an idea about the turnover rate
3 of these things over the years, too.
4 So we're going to move to the National Impact
5 Analysis and we're going to discuss a little more what
6 we -- some of the methodology used in the Shipments
7 Analysis as we kind of work our way through the
8 National Impacts.
9 Now National Impacts Analysis is a lot like
10 the LCC was. The LCC is able to quantify benefits and
11 costs on a customer level. National Impacts Analysis
12 uses shipments to extrapolate that out and to be able
13 to quantify the benefits and the costs on the aggregate
14 national level. It does this by measuring two things,
15 first the national energy savings or NES, and it also
16 quantifies and measures the net present value of the
17 total customer economic impacts.
18 To do this, DOE used two scenarios at a time
19 that we analyzed, two complete separate scenarios.
20 First is a base case for any given equipment class and
21 across all the shipments for all the equipment classes
22 rather, and the other is a standards case in which a
23 new standard has eliminated some of the lower levels.
24 In doing this, DOE calculated the national
25 energy consumption for both of the scenarios and also

1 the total customer expenditures on the ice makers,
2 whether it's operation and maintenance costs or the
3 total installed costs, and once DOE calculated both of
4 these, they were able to find the difference between
5 the base case and the standards case and it actually is
6 what helped us derive the national energy savings and
7 net present value of the customer economic impacts.
8 And once the differences were quantified, the
9 dollar values were discounted to the appropriate year,
10 in this case 2011, which was the year of the analysis
11 period.
12 A couple of key inputs that we pulled from
13 some of the upstream analyses, such as the shipments
14 model and the LCC model. First, the shipments model.
15 Once DOE was able to take the market shares that were
16 distributed across the equipment classes and use
17 available data about available model ice makers to
18 extrapolate the efficiency level market shares, also,
19 which is actually a table that's in the Executive
20 Summary, Page 22, which is what we were able to derive
21 once we found the market share across all efficiency
22 levels and all equipment classes, and in each standards
23 case where we eliminated some of the lower efficiency
24 levels, DOE used a roll-up scenario where we rolled up
25 the shipments associated with the lower levels into the

1 next newest lowest level.
2 Some of the additional costs in energy use
3 inputs that we received or that we brought in from the
4 LCC and Payback Period Analysis are things such as the
5 per unit annual electricity costs and other per unit
6 operation and maintenance costs and also installed
7 costs per unit, and we also developed and applied
8 experiential-learning or price-learning factors to the
9 equipment costs.
10 Some other inputs. Discount factor. The
11 National Impacts Analysis, we used seven percent and
12 three percent real discount rates so we could contrast
13 and compare the two to see what the differences would
14 be. Both are laid out in great detail in the Technical
15 Support Documents.
16 We also used a site-to-source conversion
17 factor, a set of them, rather. The factors that we
18 used in this case were developed using the 2009
19 Commercial Refrigeration Equipment Rulemaking as a
20 proxy, but in the NOPR stage, we will use the National
21 Energy Modeling System to create automatic commercial
22 ice-making-specific conversion factors.
23 So this is the output. When everything's
24 aggregated and we're able to put it together, we were
25 able to come up with tables like this. This one

1 specifically is the National Energy Savings by standard
2 level and equipment class and it's presented in
3 quadrillion BTUs of source energy savings.
4 Just a couple notes on reading this table.
5 The blank items should line up with the Page ES-22,
6 Market Share by Efficiency Level and Equipment Class,
7 and a blank in this case would indicate that there's no
8 associated equipment class in that level. So we
9 actually didn't analyze anything.
10 Also, oftentimes you'll see a .000, so
11 there's no identified savings that it shows right
12 there. That can mean one of two things. The first
13 thing it could mean is that there are savings there but
14 they would be in the fourth decimal place or further
15 down. The other thing it can mean is that we did not
16 identify any shipments in that level which meant that
17 there were no savings that were able to be achieved in
18 that level.
19 A similar one, the next page, actually shows
20 the cumulative net present value that we were able to
21 identify using a seven percent discount rate and these
22 numbers are in billions of 2010 dollars which is where
23 we levelized our dollar numbers to.
24 Again, one thing to note is fourth from the
25 bottom is self-contained unit water-cooled small

1 continuous, shows nothing there again because we were
2 unable to identify any shipments or models in that
3 category.
4 This is a list of questions we have about
5 both the shipments model and the National Impacts
6 Analysis model. We'd appreciate any input as well as
7 any other questions or input you have on any other
8 portion of the Shipments or the National Impacts
9 Analysis.
10 MR. BROOKMAN: A lot of data. Comments on
11 the shipments data differences, efficiency
12 distributions, and shipments equipment stock data
13 sources? Any that have not been described or disclosed
14 already? Tom Eckman.
15 MR. ECKMAN: Just how big are the
16 differences?
17 MR. CLAYVILLE: The differences here?
18 MR. ECKMAN: First question.
19 MR. CLAYVILLE: Oh, I'm sorry. So they vary.
20 I don't have the exact number off the top of my head,
21 unfortunately. I say they vary. That's not really the
22 best way to say it because they were kind of
23 consistently different across the board there and
24 there's a couple of things that we think may be the
25 reason for that.

1 First of all, AHRI doesn't necessarily
2 comprise the entire domestic market of ice makers.
3 There's some smaller companies that aren't members that
4 we may not have gotten full data for. Another thing
5 that could have differentiated the two is that the
6 Census Bureau doesn't differentiate between domestic
7 and export. So that could have done it, also, but we
8 would like any other data that we could have or any
9 other suggestions that would help us determine exactly
10 why the reasons for the differences are just so we can
11 make sure to do a quality check on the data, get the
12 best data possible.
13 MR. BROOKMAN: Karim.
14 DR. AMRANE: Karim Amrane, AHRI. Our
15 experience has been that we have found this discrepancy
16 between the two and it has a lot to do with the way
17 manufacturers do report to Census and I wouldn't be
18 surprised if you have some maybe residential ice makers
19 being lumped into the Census data and so on.
20 So I think, yes, we don't represent the
21 hundred percent of the industry but we represent a big
22 chunk and I think we are confident about our data. So
23 I would trust our data rather than Census. That would
24 be my suggestion.
25 MR. CLAYVILLE: Terrific. Thank you.

1 MR. BROOKMAN: Tom. No. So additional
2 comments on shipments data, efficiency distributions,
3 and shipments equipment stock data sources? Matt.
4 MR. ALLISON: As far as the accuracy of the
5 data goes, you know, it's hard to comment for sure but
6 I would agree with Karim that what goes through AHRI is
7 the vast majority of the market.
8 One thing this does bring up for me, though,
9 in just looking at this, I do wonder about the need to
10 even regulate at all the continuous ice makers when
11 they represent 16 percent of the market and most of all
12 these numbers here are rounding out to zero or near
13 zero in the savings.
14 If you look at the issues and the costs and
15 everything associated with regulating them, I'm
16 wondering is there value there or not.
17 MR. BROOKMAN: Thank you.
18 DR. AMRANE: If I may? Karim Amrane, AHRI.
19 What's the total quad savings? If you add those
20 numbers together, what is the total?
21 MR. CLAYVILLE: It's different. This is
22 something that I meant to have on my mind to be able to
23 give you. It's different. It depends on how you add
24 them up. You can't add the accumulation of all of
25 them. So if we took just Level 2 or if we decide to

1 take, you know, like a max tech scenario, they differ
2 right there.
3 I don't have off the top of my head but
4 they're documented in the Technical Support Document as
5 well as the spreadsheets online, too. They're
6 available on the website.
7 DR. AMRANE: But we're talking about less
8 than half a quad, I mean, right?
9 MR. CLAYVILLE: Yeah. Alan?
10 DR. AMRANE: Half a quad. This is over what,
11 30 years?
12 MR. CLAYVILLE: Yes, it is over 30 years.
13 It's a 30-year analysis period. Now we do take into
14 account the lifespan of the models that were purchased
15 in the last year of the analysis period as they go out
16 and they end their natural life.
17 MR. BROOKMAN: Additional comments?
18 (No response.)
19 MR. BROOKMAN: Okay.
20 MR. CLAYVILLE: Thank you.
21 MR. BROOKMAN: Now on to Ben Barrington,
22 Manufacturer Impact Analysis.
23 Manufacturer Impact Analysis
24 MR. BARRINGTON: Hi. I'm Ben Barrington. I
25 work for Navigant Consulting.

1 I'm just going to take you through the next
2 few slides which give you sort of a high-level overview
3 of some of the activities and methods that we use as
4 part of the Manufacturer Impact Analysis.
5 As the name suggests, the purpose of the
6 Manufacturer Impact Analysis is to identify and assess
7 the impact of the amended standards on manufacturing.
8 The key quantitative outputs of this is the
9 industry net present value as calculated through a
10 government regulatory impact model which is essentially
11 a discounted cash flow model that looks out over the
12 same 30-year analysis period for analyzing shipments
13 and product costs as well as the associated capital and
14 product conversion costs that would be associated with
15 bringing products into compliance over that 30-year
16 period.
17 The MIA is essentially broken out into three
18 phases, an industry profile phase in which we
19 characterize the industry, largely based on information
20 that was gained during the market and tech assessment
21 of who the key players are and some of the information
22 associated with that, and I'll talk more about the next
23 two phases which are sort of forward-looking at this
24 point in time in the next slide.
25 So the outset of Phase 2, which is basically

1 where we stand today, is that we'll develop a framework
2 for the industry cash flow model, the government
3 regulatory impact model, and start to populate that.
4 This is a downstream analysis. So the inputs for that
5 model hinge largely on other analyses, so the Shipments
6 Analysis, the Markups Analysis, the Engineering
7 Analysis, and the learning curve, as well, all factor
8 into this model.
9 However, in addition to that information, we
10 also develop an interview guide that we'll take to
11 manufacturers in this industry and provide an
12 opportunity for you in a confidential manner to provide
13 us with additional information that would help improve
14 the accuracy of our depiction of this particular
15 industry.
16 In Phase 3, we'll actually take that
17 interview guide to you and provide you that
18 opportunity, collect, aggregate that data and bring it
19 back and incorporate it into our model and try to
20 arrive at an accurate depiction of what the impact
21 would be to this industry at each particular standard
22 level that we're analyzing.
23 For the work that has been done to date, it's
24 largely part of the Preliminary Analysis. As
25 mentioned, when we went out to industry with an

1 interview guide looking to collect information on some
2 of the key issues that manufacturers anticipate coming
3 about as a result of amended standards, some of the
4 issues identified, at least by one, if not several
5 manufacturers, during that information collection
6 process are listed up here.
7 Manufacturers identified that new standards
8 may not be cost effective insofar as the energy savings
9 brought about by amended standards, may not justify the
10 increased product costs to manufacturers.
11 Additionally, manufacturers identified that
12 separate equipment classes should be established for
13 both continuous and batch ice makers which I think is
14 also addressed in the Test Procedure that recently was
15 published.
16 Additionally, within the continuous ice maker
17 product class, the amended standards should account for
18 varying hardnesses of ice, of the ice product. You
19 know, manufacturers also identified that, you know,
20 should prices rise as a result of amended standards,
21 customers do have an alternative source of receiving
22 ice and that they don't necessarily have to purchase an
23 ice maker. They could move to sourcing ice from a
24 different location, so bagged ice.
25 Manufacturers also cited the high conversion

1 costs anticipated as a result of this rulemaking. The
2 testing burden associated with the rulemaking,
3 potential impact to customers, so, you know, people
4 brought up form factors and the size of units here.
5 Additionally, there's a fair amount of the industry
6 represented by small restaurants who may have issues
7 with, you know, access to capital to buy new products
8 should the prices increase, and then, additionally, an
9 impact to domestic manufacturing. Several
10 manufacturers identified that they have both domestic
11 and international manufacturing facilities and they
12 could potentially shift some domestic manufacturing
13 overseas should that be more attractive.
14 And so with that, I'll open it up to comment
15 on our methods and as well as any particular specific
16 data that you'd like to provide with regards to
17 anticipated impact to the manufacturing industry as a
18 result of amended standards.
19 While I encourage people to, you know,
20 participate here and provide as much information as
21 they'd like, I'd also like to reiterate that we will
22 be, you know, proceeding with a manufacturer interview
23 guide that we'll circulate to representatives in this
24 industry and Navigant Consulting will enter into, with
25 anyone who'd like to participate in that process, into

1 a non-disclosure agreement that would protect the
2 information and keep it confidential to Navigant.
3 So in that regard, we would aggregate that
4 data and not disclose anything specific to any one
5 particular manufacturer under an NDA.
6 MR. BROOKMAN: So as you look at the key
7 issues listed in the Preliminary MIA, are there
8 additional comments there or more general comments
9 related to Manufacturer Impacts?
10 (No response.)
11 MR. BROOKMAN: I don't see any at this point.
12 MR. BARRINGTON: Okay. With that, I'll move
13 ahead.
14 MR. BROOKMAN: Thank you.
15 NOPR Analyses: Utility Impact Analysis, Employment
16 Impact Analysis, Emissions Analysis and Valuation, and
17 Regulatory Impact Analysis
18 MR. BARRINGTON: So we're coming up on the
19 end of the presentation today which is great, and thank
20 you all for your participation to this point and your
21 continued participation in the process.
22 From here, I'm just going to take you through
23 basically sort of tee-up of what we've done thus far
24 and what we have moving forward into the NOPR phase of
25 this rulemaking.

1 So people have presented on a variety of
2 topics today, detailing the Preliminary Analysis that's
3 happened to date. As a result of this meeting, we'll
4 go back and revise the results of those Preliminary
5 Analyses, incorporating any additional comments that
6 you provide in response to this meeting hereafter
7 during the comment period, and from there, there are a
8 variety of other analyses that need to happen as a part
9 of the rulemaking to determine what are the most
10 appropriate standards and way to proceed forward, and
11 I'll go into more of those on the next slide.
12 So this is the remaining analyses that we
13 didn't talk about specifically today, I guess some of
14 them we did, but, you know, moving forward in the NOPR
15 phase of the rulemaking, we'll conduct the LCC Subgroup
16 Analysis in which we look at the effect on any
17 particular subgroup of consumers, so whether that's
18 small businesses, small restaurants who might face
19 particularly harsh consequences as a result of the
20 amended standards, you know, we take a look at that.
21 Also, the Manufacturer Impact Analysis, we
22 take where we are today right now and, you know, I just
23 went through the remaining activities that follow in
24 that, but we do that.
25 Additionally, in the Utility Impact Analysis,

1 we'll model the effects on the generation capacity of
2 utilities using the NEMS and, Alan, if you'd refresh my
3 memory as to what that stands for.
4 MR. COOKE: The National Energy Modeling
5 System.
6 MR. BARRINGTON: Thank you. Additionally,
7 we'll look at the indirect effects on national
8 employment, so depending on what additional capital
9 energy savings to the consumer frees up, where that
10 money ends up in the economy, and the indirect impact
11 to employment.
12 We'll also attempt to analyze and monetize
13 the airborne pollutant emissions associated with this,
14 namely I believe it's SOX and carbon that we'll be
15 monetizing the savings, and then we'll also conduct the
16 Regulatory Impact Analysis in which we explore other
17 alternatives to a standards rulemaking that would
18 potentially elicit greater energy savings in the long
19 run.
20 I suppose I should leave that open to anyone
21 who would like to provide comment on any of these.
22 MR. ECKMAN: Doug?
23 MR. BROOKMAN: Yes?
24 MR. ECKMAN: Tom Eckman. On the Employment
25 Impact Analysis, traditionally you moved money saved

1 from energy savings into that analysis. Will this
2 include the money saved from lower water consumption,
3 as well?
4 MR. COOKE: Alan Cooke, PNNL, and I'd have to
5 say that if we actually identified water savings, that
6 that would be an operating cost that we probably would
7 move in there because it would be a direct result of
8 the standards.
9 I don't know. I think that might be new
10 ground. I don't know that we've analyzed any standards
11 where we've addressed that, but I don't know why you
12 wouldn't.
13 MR. ECKMAN: I mean, we heard earlier you
14 can't take it below 20 gallons of whatever it is per
15 hundred but --
16 MR. COOKE: But with a lot of machines, --
17 MR. ECKMAN: -- that's a lot of water if
18 you're using more than that today and water costs a
19 chunk of money in the West, at least.
20 MR. BROOKMAN: Yes, Louis.
21 MR. STARR: Louis Starr, NEEA. And just in
22 general, the single pass condensers, do we have an idea
23 of how much market that is because they use
24 substantially larger amount of water and it looks like
25 from all the numbers you have, if you know the amount

1 of them, you have the utilization rate of how much, how
2 often these machines are running, you can calculate
3 that water pretty easily. So maybe someone can mention
4 first what the market share of the single pass
5 condensers are and that should help inform the next one
6 and the water costs.
7 MR. BROOKMAN: Alan.
8 MR. COOKE: Alan Cooke, PNNL. We did discuss
9 this at some length earlier and I think we decided that
10 it's probably not zero or, I mean, it's probably not
11 100 percent single pass. It's probably something less
12 than that, especially in the large hotels, but at this
13 point, we still -- at this point, we're just making an
14 assumption and until we can find some real data or get
15 some feedback from the folks that are here today in the
16 form of some written comments, I'd have to say the
17 answer is we really don't know, don't have a good
18 handle on that number that you were just asking about.
19 MR. STARR: But you have something, right?
20 MR. COOKE: Right. Right now, we just have
21 an assumption that it's all single pass, 100 percent.
22 That's what we've assumed in our analyses thus far.
23 MR. STARR: This is Louis. So what are you
24 using for the water? For your water usage what are you
25 using as the number for an ice machine?

1 MR. COOKE: It's going to come straight out
2 of the Engineering Analysis in terms of gallons per
3 hundred pounds of ice and we'll translate that to
4 gallons of water just based on the use of a capacity
5 factor.
6 MR. STARR: Okay. So is that the 20 gallons
7 per hundred pounds of ice that we heard earlier or is
8 that a different number? Does anyone know what that
9 is?
10 MR. COOKE: It's the total of two numbers
11 actually because you have the condenser water in the
12 units with condensers that dump heat into water, plus
13 you also have the 20 gallons which is actually what we
14 call potable water. That's the actual water that comes
15 out in the form of ice, plus in batch machines there's
16 a fair amount of water that goes down the drain after
17 that batch process is over, and I think in some of the
18 continuous ones, there are some water, as well, that
19 comes in the form of a rinse or something in between
20 cycles. There's a little bit in some of those
21 machines, as well, but, anyway, it's potable water plus
22 condenser water.
23 MR. STARR: Okay.
24 MR. BROOKMAN: You can see the so-called
25 downstream analyses listed there.

1 Other comments or questions related to these
2 analyses? Daryl.
3 MR. ERBS: I guess I'm just looking at this
4 and there's -- Daryl Erbs, Manitowoc Ice.
5 The comment about potential for non-
6 regulatory approaches, can someone help me with that?
7 MR. COOKE: This is Alan Cooke again. What
8 we'll do is we'll take our models, our Life-Cycle Cost
9 and our NIA models, and we'll look at what might happen
10 if you were to make some assumptions and run some of
11 other kinds of programs, like rebate programs, or
12 something else instead of having a standard. But,
13 generally speaking, it's going to be based on
14 assumptions and whatever data we can rustle up from
15 places like Mr. Eckman's organization that has good
16 data on the impacts of rebate programs.
17 MR. BROOKMAN: Okay.
18 MR. COOKE: My colleague just suggested that
19 it would be worth asking you about what you think would
20 be good specific subgroups to look at in the LCC
21 Subgroup Analysis. As has been said, we are going to
22 look at those groups that we think will be specifically
23 hardest hit, like, say, the small mom and pop grocery
24 store or restaurant. What are your thoughts?
25 MR. BROOKMAN: Daryl.

1 MR. ERBS: Yes. Daryl Erbs, Manitowoc Ice.
2 Yes. I think I would encourage that. You know, if you
3 look at independent proprietor-run restaurants, mom and
4 pops, you know, most of them are very constrained from
5 a cash standpoint and so, you know, they don't have an
6 LCC approach. They have how much money do I have and,
7 you know, I'm going to buy the lowest cost ice machine
8 I can and it's very sensitive. They don't have a very
9 long payback window. I mean, I would say typically if
10 they don't see a payback in a year or less, it's not
11 going to be attractive to them.
12 You know, there are other segments,
13 institutional and other segments that, you know, have a
14 little longer window. So I would, you know, encourage
15 you to split those out because, you know, the mom and
16 pops still represent a large segment in the market and
17 it's not just restaurants. It's hotels that are
18 operated by franchisees, even chains. A lot of them
19 are franchise operations, so it's an individual that
20 has to put up the cash to buy the equipment and, you
21 know, they have a lot of needs for that cash every
22 year. So I'm not even sure it's by end use segment but
23 it may be by whether it's an individual owner versus a
24 corporate or, you know, some other type of larger
25 financial institution.

1 MR. BROOKMAN: Other comments on affected
2 subgroups that would be helpful to the department to
3 explore?
4 (No response.)
5 MR. BROOKMAN: Nothing additional comes to
6 mind? People who would be -- groups who would be
7 disproportionately affected?
8 (No response.)
9 MR. BROOKMAN: Okay. Thank you.
10 MR. BARRINGTON: Great. Terrific. With
11 that, we'll move forward then and I guess that brings
12 us right to Closing Remarks, which I think --
13 MR. BROOKMAN: We're going to fast forward to
14 the --
15 MR. BARRINGTON: Just go right to it?
16 MR. BROOKMAN: -- next one, to the -- is
17 there a final slide that shows how they profile their
18 comments? Here we go.
19 Now, as we said this morning first thing,
20 another opportunity for anybody that wants to make
21 closing remarks, raise any additional issues that
22 haven't been raised fully, describe issues that are
23 important to cover here at the close.
24 Yes. Daryl.
25 MR. ERBS: Daryl Erbs, Manitowoc Ice. I

1 guess I want to just kind of revisit some of the things
2 that were in the document but I think through our
3 discussion have really been, I don't know, confirmed
4 or, you know, brought more to the surface and to me,
5 it's really fundamentally important that we have an
6 accurate assessment of what the potential cost impact
7 is for these efficiency levels and, you know, as we
8 discussed, we'll work to help provide information so
9 that we can get to a more realistic basis for that
10 because without having a good set of cost basis for
11 improving efficiency, then everything else gets
12 affected and we could go down a very wrong path for the
13 industry.
14 I would like to hopefully in some follow-up
15 understand more about the modeling that's being used.
16 We really didn't get a chance to talk about the freeze
17 model and how it actually works and whether it's been
18 validated because, well, it's theoretically, I think,
19 possible to model the process of freezing water into
20 ice. When you get into the harvesting side of it,
21 that's even more dynamic and I think difficult to model
22 and I don't have a very good understanding for how that
23 model actually represents that part of the process.
24 You know, Matt had mentioned at one point in
25 the discussion, you know, putting a bigger condenser in

1 may look like it's going to improve the efficiency of
2 the cycle but because you have less heat to operate
3 with, when you're harvesting, you may not see as much
4 benefit as a model might predict if it doesn't fully
5 account for all those interactions.
6 So I think that's an important element that
7 needs to be explored further because that model is
8 somehow driving some of the decisions and some of the
9 estimations of the energy efficiency and these new
10 standards will, unfortunately, be written into law
11 before the manufacturers have the opportunity to go out
12 and try some of these things fully and really
13 understand how they're going to work in practice
14 because I don't believe the timing allows for DOE or
15 its contractors to actually build and test systems to
16 do any validation around some of these concepts.
17 So I think we have to be very cautious or we
18 could end up driving designs by efficiency standards
19 that will cause us to make larger ice machines that
20 don't fit anymore. I'm not convinced we can predict
21 where all of our designs will end up having to go to if
22 we have to stretch to very high-efficiency levels.
23 If they're sort of within the efficiency
24 levels that exist in the marketplace today, we probably
25 have, you know, a better handle on it. So I'm just

1 concerned that we push for these maximum levels that we
2 don't have a lot of experience with.
3 And then I've raised some other issues around
4 how some of the assumptions for how the added costs get
5 passed on to the end customer and so again I'd like to
6 explore that further to make sure that we're not
7 underestimating the actual price to the end customer,
8 you know, in terms of adding costs to the unit.
9 MR. BROOKMAN: Okay. Thank you. Yes. Matt.
10 MR. ALLISON: Matt Allison with Scotsman.
11 Just to accentuate a couple points that Daryl made, you
12 know, it seems like there's a couple of really key
13 pieces that really drive where this goes and one of
14 those is being the cost that drives the model and the
15 cost for the technologies that we would incorporate.
16 We really need to make sure that those are accurate and
17 we'll do our best to supply information around that to
18 make sure they're what they need to be.
19 But the second area that I really don't see
20 getting addressed anywhere is validation of this model.
21 I mean, the model is really driving what efficiency
22 levels we can get to with what technologies and I don't
23 see where it's in this process anywhere where anybody's
24 going to put, you know, an ECM fan motor in an ice
25 machine and see if it really does give us two percent

1 or five percent energy reduction, whatever it is, and,
2 you know, it seems like the model's very incomplete
3 until that occurs.
4 So I don't know if that can be worked into
5 the process in any way, shape, or form. I mean, we can
6 attempt to do something like that but right now, I
7 think that model is driving a lot of decisions that may
8 be erroneous.
9 MR. BROOKMAN: Other closing remarks? Karim.
10 DR. AMRANE: Karim Amrane, AHRI. Well, based
11 on what's presented to us today, I think it's at least
12 for AHRI, it's clear that there are some issues with
13 the analysis, in particular, the Engineering Analysis,
14 the cost efficiency curves, and also the LCC Analysis.
15 So, yes, we'll be working with you, with the
16 department to try to improve those analyses, but at the
17 same time, I would like to urge DOE not to rush this
18 rulemaking and to go back and revisit those analyses to
19 see where there could be improvement.
20 As I suggested before, you know, maybe a
21 retail survey might not be a bad idea to check where
22 equipment is in terms of cost and see whether your
23 model is predicting the right cost increase.
24 So I think we are very concerned with what
25 we've seen today and hopefully everybody will go back

1 and review all this, but we intend to supply you with
2 some information.
3 MR. BROOKMAN: Anything else?
4 (No response.)
5 Next Steps and Closing Remarks
6 MR. BROOKMAN: Okay. So then for my part, I
7 thank you all. This was a very constructive exchange
8 today, a lot of information for the Department of
9 Energy, and my personal thanks, and I'll send it back
10 to Charles Llenza for Closing Remarks.
11 MR. LLENZA: I want to thank everybody for
12 attending today's proceedings on the Automatic
13 Commercial Ice-Making Pre-Analysis, by the way, which
14 is a critical keyword here, and we do encourage
15 everybody here and everybody online to take another
16 look at our methodology and not only our numbers but
17 our methodology here and approach and to send us
18 comments.
19 As you can see on this slide, there's e-mail
20 address. You also can send it by slow mail and/or
21 courier and we do have a comment period that ends March
22 9th. I do think that, based on some of the comments
23 here today, while we don't necessarily like to extend
24 the comment period, we certainly could extend this
25 comment period a bit more in order to give the people

1 here attending this meeting and people online a bit
2 more time to provide more analysis or thought into the
3 process presented here.
4 MR. ALTMAN: Charlie, this is Ari, GC's
5 Office. What would be the procedure for those
6 commenters who are interested in extending the comment
7 period? That doesn’t just happen automatically, does
8 it?
9 MR. LLENZA: No. We just wouldn't extend it
10 automatically, if we received several parties'
11 requesting an extension to the comment period, we would
12 be probably be amenable to do that at this time.
13 We also will go back and because we have not
14 provided some of the details of the TSL levels that we
15 presented here today, efficiency levels, it's also
16 something that we will put together and to look for
17 either in an e-mail blast announcing that we have put
18 them on our website. We will provide an update to
19 today's presentation with the corrections from today's
20 proceedings and there will also be a transcript
21 available on the discussions of today for everybody to
22 take a good look at within the next week or so.
23 So I also wanted to provide some general
24 information in terms of our website and the web page
25 for our particular product here for automatic

1 commercial ice makers. My e-mail address and phone
2 number, you're certainly welcome to contact me, but I
3 would recommend e-mail better and most of the comments
4 or requests I will certainly enter to the record so
5 that we have those recorded, and also -- if there's
6 anything in particular that the Department should know
7 at a general level, there's John Cymbalsky's number and
8 e-mail information on there, too, if he needs to be
9 contacted.
10 So as I promised, the backup slide has the
11 listing of questions. I'm not going to go over all
12 them but, once again, thank you all for attending
13 today's proceedings on behalf of the Department of
14 Energy.
15 MR. BROOKMAN: And we should thank those that
16 have joined us via the Web.
17 MR. LLENZA: Also.
18 MR. BROOKMAN: Thank you. Safe travels.
19 (Whereupon, at 2:17 p.m., the meeting was
20 concluded.)
21
22
23
24
25

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before:

U.S. DEPARTMENT OF ENERGY

In the Matter of:

PUBLIC MEETING ON ENERGY CONSERVATION STANDARDS FOR AUTOMATIC COMMERCIAL ICE MAKERS

Were held as herein appears and that this is the original transcript thereof for the file of the Department, Commission, Board, Administrative Law Judge or the Agency.

Further, I am neither counsel for or related to any party to the above proceedings.

Debra Derr
Official Reporter

Dated: February 23, 2012